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Rock Products

and CEMENT and ENGINEERING NEWS (Est. 1896)

THE OLDEST PUBLICATION IN ITS FIELD AND THE RECOGNIZED AUTHORITY

The Very Next Issue!

A Big, Glistening, Colorful Review of Industrial Progress

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Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

330 S. Wells St.
CHICAGO

During the winter- Plan for the Spring

SOME "MODERNIZATION FOR PROFIT" SUGGESTIONS

PLAN for lower operating costs and a better product when your plant opens up next spring, by making replacements and additions to your equipment now.

To take fullest advantage of the greater opportunities which should come from Government and other work, you must be able to meet rigid specifications.

A few suggestions for profitable modernization are illustrated. There are others. Send for Book No. 1240.

5486

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The Leading Manufacturer
of Equipment for Handling Materials and Transmitting Power

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Supplement your rotary screens with Link-Belt vibrating screens to obtain a better grading of the smaller sizes of gravel or stone. Rotary screens for better washing — vibrating screens for better sizing. The combination of both rotary and vibrating screens assures your ability to meet the most rigid specifications.

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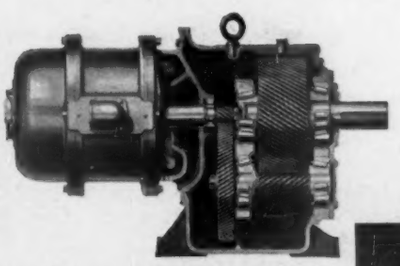
Replace your old, plain-bearing belt conveyor idlers with modern Link-Belt anti-friction bearing idlers. Save power, assure dependability and cut down maintenance costs.



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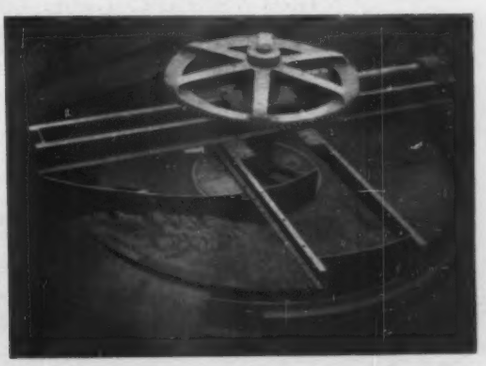

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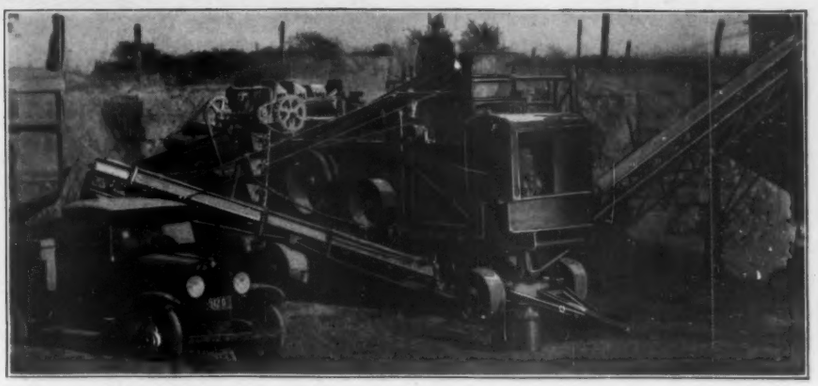
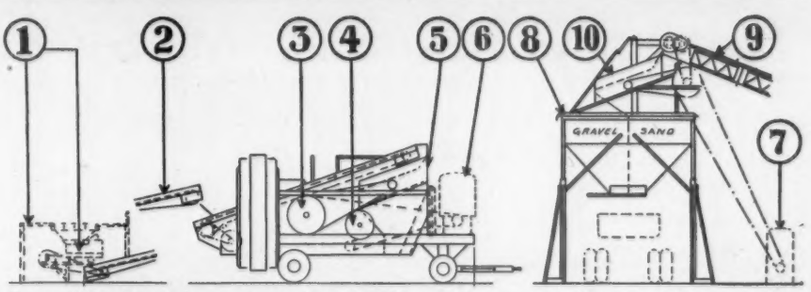
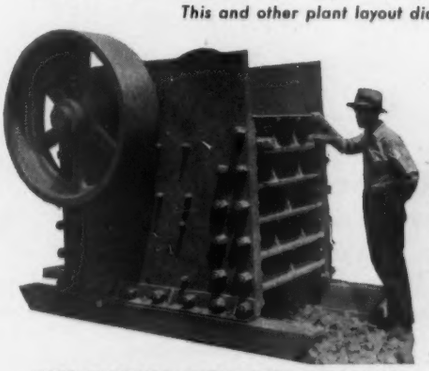
Portable Washing Plant. 100% portable and with a capacity of 1000 yards of finished product per day. Low first and operating costs.





Portable Crushing Plant No. 100, installation photo and detailed diagram shown above. (1) Mechanical feeder and loading trap (optional). (2) 30' by 24" roller bearing conveyor from mechanical feeder to crusher. (3) 9 by 40 crusher. (4) Reduction crusher. (5) Gyrating screen, 21/2 deck. (6) Motor, with belt (optional). (7) Motor for driving conveyor to screen and screen itself (optional). (8) 15-yard steel bin, two compartments. (9) 57' by 24" roller bearing latic conveyor—need not operate at right angles to crusher. (10) Single deck gyrating screen. Length of crusher unit, including conveyor, approximately 56 feet; width of plant, approximately 70 feet.

This and other plant layout diagrams will be sent on request.



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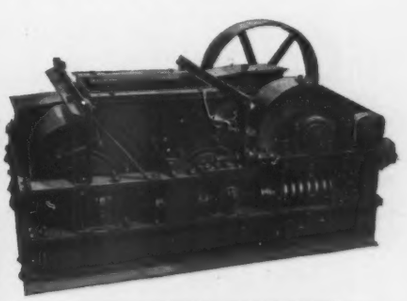

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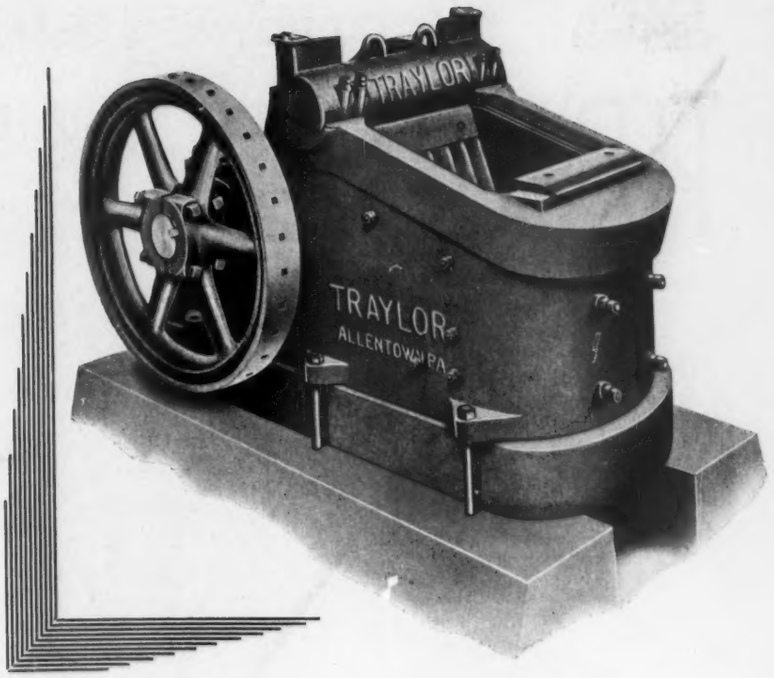

you lose if you don't use the TRAYLOR *BULLDOG JAW CRUSHER*

We want to do one of two things for you —send you our bulletin No. 2099, or have our man see you, and when he comes around ask him about our new jaw crusher with curved crushing plates—or we'll write you about it. Get in touch with our office nearest you, today!

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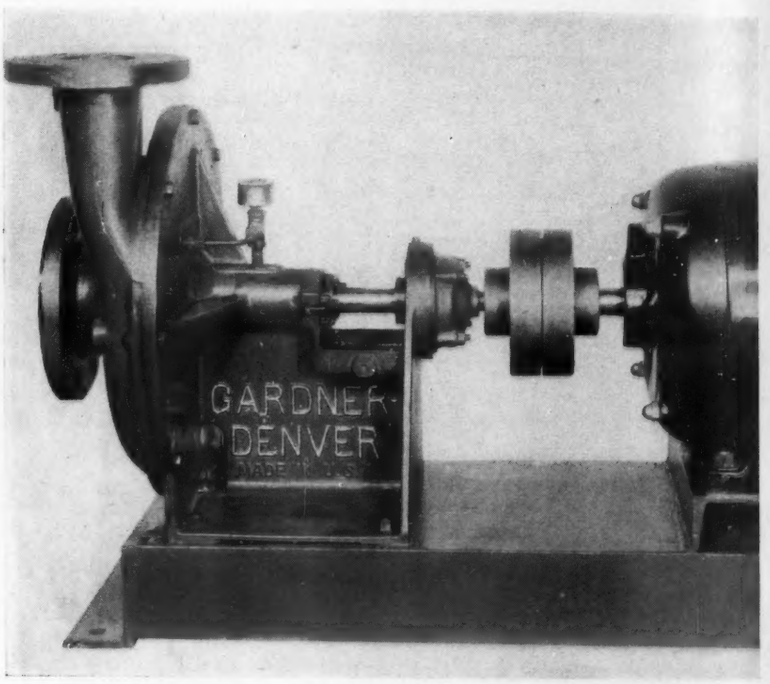

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SKF

BALL AND ROLLER BEARINGS 3505 **SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILA., PA.**

IT PAYS TO KEEP MACHINERY IN PROPER REPAIR

• The tendency in dull times is to economize by omitting necessary repairs to machinery.

• But even a depression might not justify risking ruination of machinery representing a large investment, for want of a few inexpensive replacement parts.

• Not only is there the danger of injury to the machine, but a breakdown, when it occurs, usually comes when the machine's capacity is most required.

Idle periods are an opportune time to overhaul; busy periods require the machines to be kept up.

• AND REMEMBER, when obtaining repair parts, that the manufacturer of the machine for which they are intended has gained experience with many similar machines in other plants—that he is constantly making improvements in those parts based on this experience—that his shop is equipped with tools specifically for the manufacture of such parts—that he is interested in supplying parts that will assist in obtaining the highest efficiency from the machine itself—that the parts are usually made to templet, making easy changeability—and that many of the parts are patented.

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F. L. SMIDTH & CO.

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Manufacturers of CEMENT MAKING MACHINERY

Designers of CEMENT MANUFACTURING PLANTS

Let's Look at Cordeau - -

for Giant Blasts, et cetera

What do we mean by "et cetera"? Anything from giant blasts to single shots, with well drill, wagon drill or jackhammer holes; pocket, tunnel and broken loads; mud capping, demolition, ditching, and submarine . . .

Look at Cordeau Bickford Detonating Fuse *for better blasting.* Maybe you can use it profitably.

1. ***More work from explosives*** because the line of Cordeau acts as a detonator for *each* cartridge in the hole. The detonating wave is carried by the Cordeau.
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3. ***Simplified loading*** because no primers are needed in the loads.
4. ***Better fragmentation*** because the Cordeau hook-up can be planned to fire each hole in rotation. *The time interval is infinitesimal,* yet it serves to *relieve burden.*
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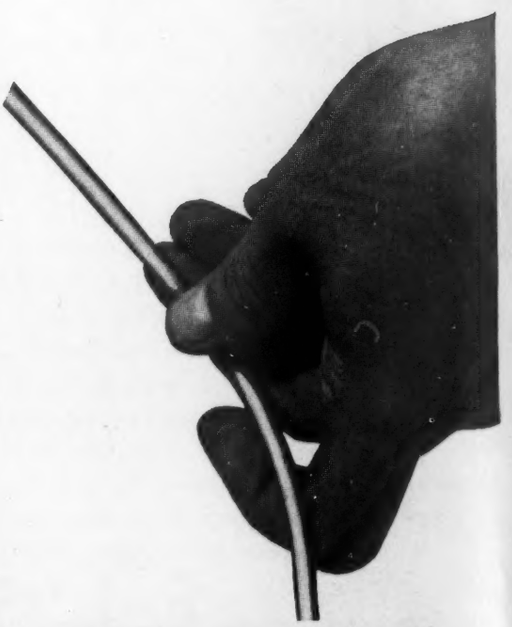

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DETONATING FUSE
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ALSO SAFETY FUSE *Since* 1836

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CB-49

NO TIME *for* IDLE TIME *when* tonnage must move

With today's close operating margins —machines must take it and like it

Keeping tonnage on the move is often the biggest profit factor on many a schedule. There's no place for a "sick" machine anywhere. And in keeping machines healthy and on the job, your smallest item of expense, lubrication, can be an ever-growing liability . . . or your greatest asset.

Every machine in your line-up presents a special problem. The use of lubricants specifically adapted to your varied units will go a long way toward maintaining efficient operation. Texaco *tested* Lubricants have proved their ability to help keep tonnage moving, to lower operating costs through reduced maintenance.

Let a Texaco representative prove to you how Texaco Lubricants and engineering service, in cooperation with your men, can mean substantial savings. This service is yours to use.

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THE TEXAS COMPANY
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REFINERY TESTED FOR UNIFORMITY • • • SERVICE TESTED FOR ECONOMY

Obviously

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A wire screen is just as good and no better than the wire of which it is fabricated. Screening will give long, trouble-free service only if strength and stamina are inherent qualities of the wire which goes into the screen.

Making wire has been Roebling's business for 90 years—over 50 years in the making of wire fabric. This background—these years of experience which go into every screen we deliver, are available to help in the solution of your wire screen problems.

Roebling Wire Screens for sizing, cleaning and grading are made in a variety of types and metals to meet even the severest requirements as to efficiency and resistance to vibration and abrasion.

We would welcome your inquiry and an opportunity to cooperate with you.

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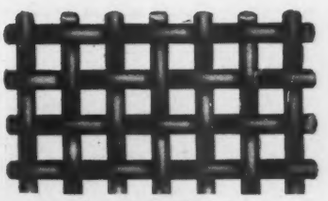
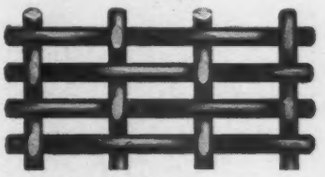


Square Mesh Wire Screen



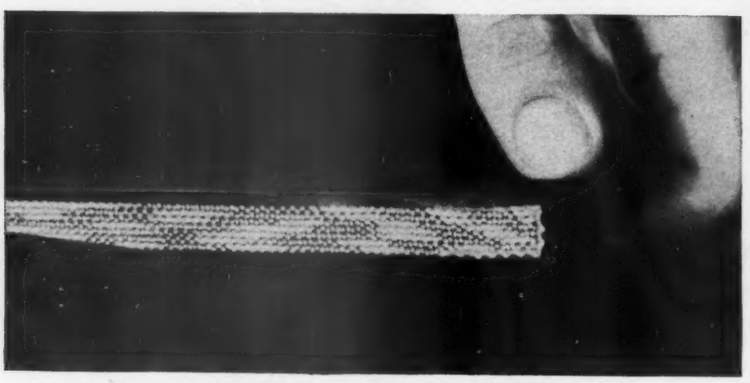
Oblong Mesh Wire Screen

ROEBLING *Wire Screen*

TRADE JERSEY MARK

ROEBLING — MAKERS OF WOVEN WIRE FABRICS FOR OVER HALF A CENTURY

Goodrich Belt in the mixing conveyor of a large fertilizer plant. This has already outlasted its predecessor of a competitive make of the same specifications and still looks as good as new.



Cross-section of Goodrich Conveyor Belt showing the special Highflex Bonded edge.

Goodrich sorting belt at a South Africa mine. A Goodrich Belt in this service carried 1,522,915 tons of gold-bearing ore.

FIGURE C
AS YOU F

WHEN you buy conveyor belting, you *don't know* what you pay for it. That won't be determined for months or years because true cost is cost per ton of material handled.

On that basis, low-price belt, or belt improperly engineered to the job, is usually the most expensive belt you can buy. Its *price* may be low, its *true* cost per ton mile excessively high. Suppose one belt costs 5% or 10% more than another. A few months more service, a few thousand tons more handled, and that greater *price* would become a profitable *investment.*

In thousands of installations, Goodrich Conveyor Belt has proven the most profitable investment, the most con-

ALL *products problems* IN RUBBER

Goodrich

Slag handling is a true test of conveyor belt stamina. Goodrich Belts are famous for their resistance to the abrasion and cutting action of such materials.

Part of thousands of feet of Goodrich Conveyor Belt on a huge construction project in the middle west.

CONVEYOR BELT FIGURE FREIGHT -COST PER TON

sistent dividend-payer. Its service is longer, its true cost is less because of its seven important improvements.

Consider just one of these seven improvements—the Highflex Bonded edge. This special construction anchors the edge to the carcass and cushions the edge of the belt against gouging and wear. It is this bonded edge which permits Goodrich belt to stand the terrific punishment of mis-alignment which is sometimes impossible to avoid and which tears other belts to pieces so quickly.

Every one of these seven Goodrich improvements can reduce your belt cost, because every one makes Goodrich Conveyor Belts last longer, reduce maintenance and shut-down time, haul more for less money. We are so sure Goodrich Belts will prove this in your operation (as they have in thousands of others) that we welcome exact comparison. We have prepared a cost-finding record book. Send for one, free, for each conveyor you have. Keep exact records, and let Goodrich Belts, running side by side with any other belts made, *prove* their greater economy and value. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, O.

Conveyor Belting

The Koehring Wheel Dumptor
for hauling · dumping · spreading

Full vision for the Koehring Dumptor operator means fast loading, quick getaway, spot dumping and spreading. He has complete eye control of all operations from the driving position . . . the load is always ahead of the operator . . . for quick and easy spotting at the loading unit and instantaneous dumping . . . *seconds saved* in every operation by eliminating all unnecessary moves.

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FULL VISION for SPEED

The load is instantaneously dumped by force of gravity, without time-losing mechanical complications.

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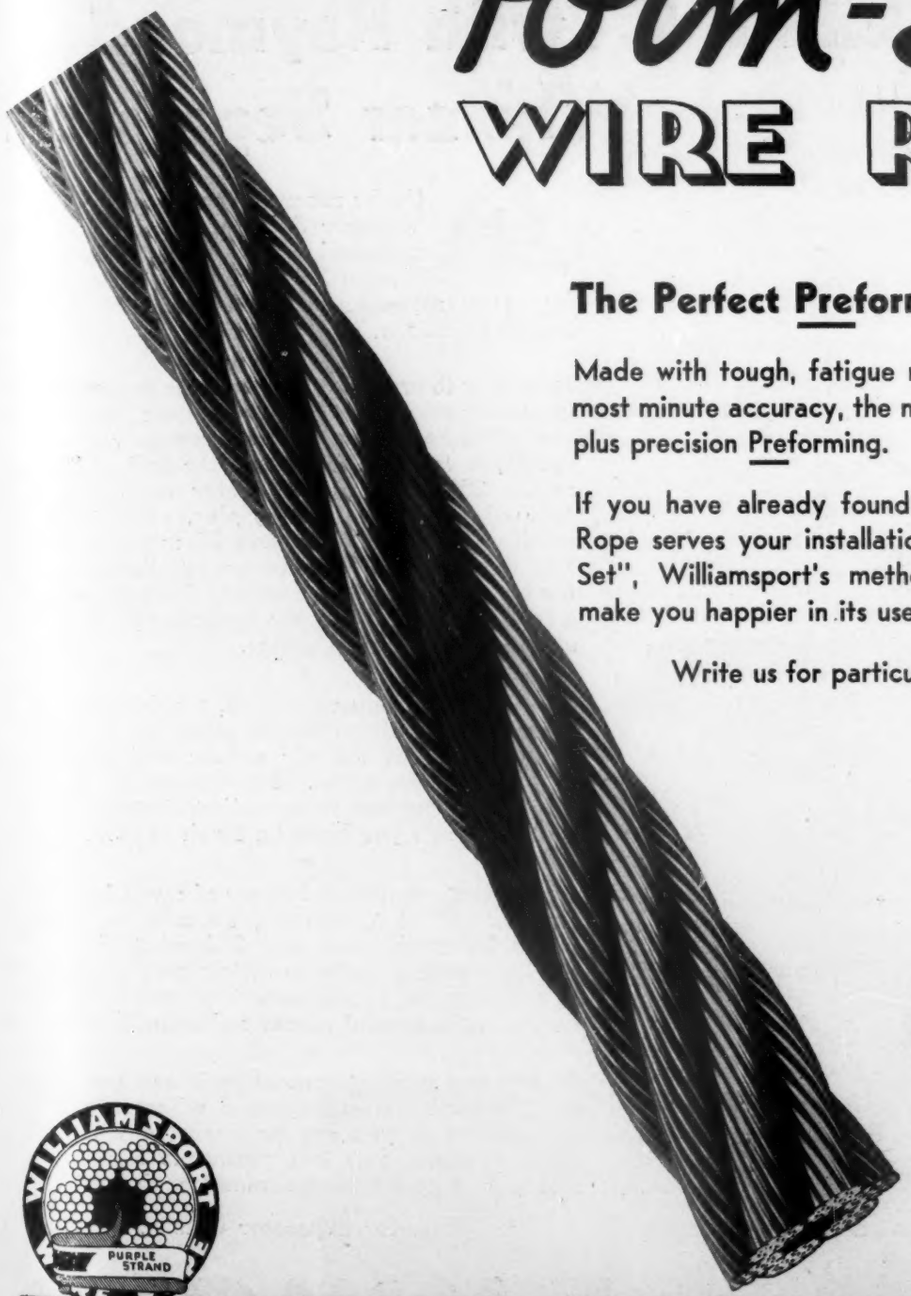

The Perfect Preformed Wire Rope

Made with tough, fatigue resisting wire, with the most minute accuracy, the most careful fabricating plus precision Preforming.

If you have already found that Preformed Wire Rope serves your installation better, then "Form-Set", Williamsport's method of preforming will make you happier in its use.

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On its record of performance, the Whizzer Separator is firmly established in the cement field, and is regarded as standard equipment by many manufacturers for both raw and finish operations.

•

Its ability to produce an extra large percentage of extreme fines, yielding good "flour" tests, is one of the reasons for its preference. For example, in taking a feed from the mill of 85% minus 200-mesh, the separator delivered a finished material of 99.9% *plus*, passing 200-mesh—88% of it finer than 25 microns and 78% finer than 20 microns—an excellent grade for high early strength cement. On a job with a fairly fine mill grind, the separator produced almost 100%, 325-mesh fines.

•

Capacities run unusually high, too, because of the patented whizzer device which throws the oversize out of the air stream and greatly accelerates separation. In a northern plant, a 16-foot Separator is exceeding its guarantee of 175 barrels per hour on finish clinker.

•

In grinding raw mix, a battery of seven 14-foot "Raymonds" is classifying material to 92% minus 200-mesh, each unit delivering 25 tons per hour with a variation of less than one-half of one per cent in fineness. The first installation brought several repeat orders on this job.

•

If you are making cement, you can operate more profitably with Raymond Whizzer Separators—and if you are producing any other rock products, you also want the high efficiency that goes with Raymond equipment.

Write for Separator Catalog

Raymond "Whizzer" Mechanical Air Separator available in eight sizes from 4 ft. to 18 ft. diameter, also 30-inch laboratory size separator.

RAYMOND
BROS. IMPACT PULVERIZER CO.

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1307 North Branch Street Chicago
Sales Offices in all Principal Cities
Canadian Representative:
Combustion Engineering Corporation, Ltd., Montreal

Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Volume XXXVIII | Chicago, December, 1935 | Number 13

The RESIDENTIAL and COMMERCIAL Building MARKETS for ROCK PRODUCTS

DEMAND Will Be Measured by AGGRESSIVENESS of Producers and Manufacturers, for COMPETITION Is Keen and Well Organized

THE PERCENTAGE of "permanent" structures to the total number of buildings used for residential and commercial purposes in this country is exceedingly low, almost insignificant. Speed of erection and cheapness have been generally the deciding factors. Consequently, fire, wind, earthquakes, floods, termites and natural decay exact enormous tolls. Now, after a lapse of nearly 10 years, we are about to experience another period of activity in such construction. We are about to take up the slack in demand, to replace many buildings destroyed, to repair and rehabilitate those that are left. What shall we build with?

The answer to that question is vital to nearly every rock products producer and manufacturer. They are bound to get some share of this business, they always have. Recent statistics on a slum clearance housing project in New York City show that materials cost about one-third of the whole cost of the project, and that rock products building materials cost (on the job) about one-sixth of the total material cost. So one-eighteenth of the total cost of modern housing is about the cost of the rock products materials. Assuming that freight, cartage, and other distribution costs double the price that the producer or manufacturer receives, which is a reasonable assumption, about one-thirty-sixth of the cost of a modern housing project would reach the rock products producer. Say that 2 billion dollars will be so invested in 1936 and we have a *normal* prospective demand for rock products from this source of approximately $60,000,000. Can rock products producers get more than this? They certainly will not get more by waiting for the business to come to them.

Rehabilitation and Repairs

Let us look first at the possible market for rock products in the rehabilitation and repair of existing structures. This would naturally start with basements, as in nearly all new houses and buildings there is a decided tendency to make basements fireproof, or at least fire-resistant, and attractive.

We know that the Portland Cement Association has done a great deal to promote the use of precast concrete joists and concrete-protected sub-floors, or basement ceilings, in new buildings. Is it feasible to install such floors in existing frame structures? It should be; we would like to see some engineering talent devoted to that study. If this concrete joist and floor market could be expanded to include such replacements, much increase in the demand for cement and aggregates would result.

With heated basements, something almost every home-owner needs is a vegetable cellar or compartment, shut off and insulated from the rest of the basement. The good old days when you could lay in a barrel of apples, at the time good apples were readily available, or a few bushels of potatoes, for the winter's supply, are just about gone for most of us. Then, too, such a cellar could be used for liquid stores—basement bars are popular, why can't wine cellars be made equally so?

As we proceed upward in the dwelling, or building, it is obvious, of course, that the perishable exterior can often be improved by a coat of stucco. But why stop with that suggestion? Why not a special concrete or sand-lime unit that can be placed around the wood frame in blocks or panels? At the same time some rock product insulating material could be placed behind them. The frame could be so braced and strengthened that wood sheathing could be left out of the finished structure, and walls thus be made practically fireproof.

If you are interested in physiognomy and character study you will be interested in this portrait—B. F. Fairless, new president of the Carnegie-Illinois Steel Co., who very likely will eventually direct the business policies of the world's largest industrial organization, the United States Steel Corporation. He is a college graduate son of an Ohio coal miner.

—Acme Photo

These, and many other much practiced ways of using rock products in wood or steel framed dwellings and commercial buildings, are feasible, economical and generally desirable, but they will not come into wide application unless everyone interested in producing any one of the ingredients does his part. The portland cement manufacturers have done and are doing much but can not do it all. The aggregates producer, the lime manufacturer, the gypsum manufacturer, the rock-wool manufacturer must work together, at least to the extent of selling the idea of fireproof, permanent types of construction.

Markets for Aggregates

Every little bit of concrete requires its quota of aggregates, however small. Cement manufacturers are fully aware of the total importance of these little bits of concrete as a market or potential market for cement; and the lime and gypsum manufacturers are aware of this market for their products. But few crushed stone, sand and gravel, and slag producers appreciate the size and importance of this market. They ship to building supply dealers, but usually not specification materials—too often probably they use the small-town dealers to dump material that does not meet specifications for important engineering work.

Most small cities—and some large ones—fail to provide adequate specifications or requirements for aggregates used on such small jobs; if they have building code specifications for aggregates they are seldom enforced because such jobs are usually not inspected. To the average home owner, and to many architects who may possibly supervise these small jobs, sand is sand, and coarse aggregate is coarse aggregate.

This market might be made a real one for the best grade of aggregates—a profitable business; for the total amounts involved in any one job are too small to make the price of the aggregates the all-important consideration. The buyer does not know that these aggregates should be carefully washed and sized and graded if he is to get the full benefit of the "permanent" improvements he is making. The average building supply dealer is not particularly interested, even if he himself knows the difference between good and bad aggregates.

Where the job is big enough, scientifically made ready-mixed concrete is undoubtedly the answer. Experience in Detroit which is already enjoying a building boom proves that the popularity of ready-mixed concrete is growing. But there still exists a market to be developed for high class aggregates in small lots. It will require education of both the dealer and the user; it may require adequate building codes; it probably will require advertising in the local newspapers. This could well be done as a coöperative enterprise of local producers.

Batched Aggregates in Small Lots

More than that, probably, it will require handling and distributing aggregates in smaller lots than either dealer or producer now likes to handle. Possibly the answer to this is premixed dry batches of the proper proportions of sand and coarse aggregates, with possibly the cement added. Sanded plaster mixes have been sold in bags or other containers for many years. One sand and gravel producer we know of in a Western city has for several years sold small dry batches of cement, sand and gravel, using wood or metal containers such as are frequently used to deliver lime putty. Sand for children's play boxes has been sold by enterprising producers and dealers in bags for many years. Recently, we saw an attractive circular advertising "safety sand" in bags for sanding icy sidewalks, drives, etc. Possibly several producers are already selling concrete batches in this manner; we claim no originality for the suggestion; however, it is not yet common practice.

New Construction

No portion of the earth's crust is immune to earthquakes. They simply demonstrate that the unstable earth's crust is constantly readjusting itself to changed surface conditions or topography—some of these changes are taking place now, some perhaps happened thousands of years ago but adjustments of the earth crust have still to take place. Earthquake-proof structures should not be confined to presently active earthquake regions. Moreover, buildings that resist earthquakes also resist damage by tornadoes, fire and flood. Such structures command much lower insurance rates, and in the long run this means a real saving.

The most recent residential building boom resulted in the construction of an enormous number of "pasteboard" houses—made largely of poor grades of cheap, green lumber, sheathed with pulp board or under-sized siding, hastily thrown together. They often had attractive exteriors—temporarily so—and the chief sales arguments were built-in features like breakfast nooks, ironing boards that folded into kitchen closets, etc. People are still paying for such houses, although their useful, economic life is hardly more than that of the family automobile. Because of the high cost of financing, these houses cost as much as good construction would cost today. Permanence should not be difficult to sell in the coming building boom, in the light of this recent experience.

* * * * * * *

Imported Building Materials

A lot of publicity has resulted from the contemplated use of $100,000 worth of German structural steel on PWA's Triborough bridge job in New York harbor. Newspaper editorials galore take up the cause of the American steel industry and workers' unions in the American steel industry. Probably more than $100,000 worth of imported cement has been used for PWA and WPA jobs, with some, but comparatively little public protest. Probably American cement manufacturers have no taste for being a tail to the steel industry's kite, but the present agitation presents the opportunity, nevertheless, for cement manufacturers to call this use of foreign cement to the attention of their local newspaper editors. Cement manufacturers in the East have indeed already used the opportunity to good advantage. It all helps to expose a few of the many inconsistencies of the WPA and PWA, in which newspaper editors are becoming more and more interested.

Another PWA and WPA Inconsistency

The most glaring inconsistency is the WPA encouragement of government production of aggregates. In order to provide inefficient and costly employment for several thousand men, some few thousand efficient, conscientious, industrious taxpayers are deprived of their legitimate means of livelihood. Protests by the industry at Washington or elsewhere appear to accomplish nothing. But the speed with which Mr. Secretary Ickes and other high officials found alibis, when groups of voters the size of the steel industry's labor unions made public protest, is not merely amusing; it is as enlightening as it is pathetic.

Clearly, if the crushed stone, sand and gravel and slag industries are to fight successfully this unwarranted encouragement of government competition in their field they must enlist the help of groups of local voters. If these producers would learn and apply, with the aid of their employes, some of the methods of political organization used by precinct politicians, they might soon be able to put real "heat" on both local and national politicians.

* * * * * *

Newspaper Advertising Would Help

Coöperative advertising by groups of producers in local newspapers along the lines discussed above, for promoting the use of high-grade aggregates, would be a great help to a campaign to put the government out of this industry —which is about the only one left; the government has already retired from competition with private producers and manufacturers in nearly every other instance, due largely to the pressure of organized labor. Generally speaking, the public is not industry-conscious in the case of crushed stone, sand and gravel and slag. Until it is, successfully combating public competition will be difficult.

* * * * * * *

Taxes Are a Real Political Issue

An issue in the recent election of the New York State Legislature (assemblymen) which has not received much attention outside the state was the increased gasoline tax and the diversion of the funds thus raised to other than highway purposes. The democratic governor had forced a democratic majority in the legislature to increase the gasoline tax from 3 to 4c, adding $15,000,000 a year to the tax burden of motorists, and at the same time diverting a large part of the gas tax fund to relief purposes. The republicans made it an issue and turned out of office many democratic assemblymen who voted for the increased tax, and incidentally achieved a majority in the new assembly.

This ought to be more significant to the party in power in Washington, D. C., and in most of the state governments than the mere fact that there were more democratic votes as a whole in the New York State election than there were republican votes. Constant increases in taxes are never popular, and when it becomes apparent that the money so raised is being largely wasted, either one of two things invariably happens; the people stop paying taxes, which, if enough of them join in doing, results in anarchy, or they rise up and throw out the government responsible, either through the ballot box or by violence. History proves without exception that those who labor to produce the sustenance of society will only so long support a parasitic army—whether it actually carries arms or sits in office chairs. Since our present army of parasites does not carry arms it probably can be (and will be) easily gotten rid of by means of the ballot box.

Taxes Directly Decrease Employment

All taxes result in increased prices of commodities, and hence reduce consumption to barest necessities. The payroll taxes for "social security," which go into effect next year, will cause unemployment directly because they will bear heaviest on those with large payrolls. They will necessitate all competitors reducing payrolls by the employment of every possible labor-saving device. This, of course, will stimulate the machinery industries, but they in turn will introduce new labor-saving devices, so that the sum total will add to the unemployed. No producer at this time can afford to make long-term commitments. Taxes on taxes as we have in prospect may increase his costs beyond all expectations.

Silicosis Rates Frighten California Producers

PROPOSED insurance rate increases in California to cover alleged silicosis risks will run from around $1 to $28 in the basic rate for this coverage, and will effect an average increase in insurance costs of 115%. However, surcharges on some of the various classifications provide for increases of 102%, 468%, 669%, and run as high as 990%. It is understood, though, that a schedule of credits will allow for reductions in some cases.

Some 70 claims were filed during the last year with the California Industrial Accident Commission. Of this number the commission reported that 12 have been heard and found to involve no liability on the part of the employer or insurance carrier. Two other cases were dispatched under closing orders. The commission reported also that the rate at which claims are being filed is diminishing.

Silicosis claims paid during the last few years have been negligible, and the potential losses that insurance companies may suffer in the future cannot be based upon experience nor hardly can they be estimated in the light of the number of claims filed.

However, the California Supreme Court, in a decision last year, opened the door for adjudication of "stale claims," by ruling that there is practically no time limit on claims for such occupational diseases as silicosis. This action created not only an added threat to the welfare of insurance carriers, but also to a number of self-insured industries.

Industry and labor joined hands in protesting the proposed new rates at a hearing in San Francisco on November 17. Representatives of the several industries claimed that silicosis was not a problem in California, and labor leaders, while admitting there was some in certain types of occupation, asked that the problem be remedied by strict prevention laws and called upon industry to co-operate more effectively with labor in obtaining such laws.

Insurance carriers, their intent and sincerity, were vigorously attacked also, and open threats were made that monopolistic compensation would be sought if the carriers did withdraw.

DEMAND for Aggregate in the Great Plains District As It Influences Plant *CAPACITY* and Location

By John H. Ruckman
Consulting Engineer, Topeka, Kan.

IN PREVIOUS ISSUES the writer has discussed some of the physical conditions that influence the production of sand and gravel in the region west of the Missouri. Others have called attention to the situation that exists relative to competition and the problems of merchandising. This discussion deals with the manner in which the nature of the demand and transportation charges, to a great extent, fix both the type of plant and number of concerns which can operate successfully.

A glance at the statistics published by the United States Geologic Survey shows that in 1928 the tonnage of sand and gravel (including a small amount of glass sand) produced in the three states of the central plains

Nebraska	2,420,364 tons
Kansas	2,254,648 tons
Oklahoma	2,415,069 tons

A 12-in. centrifugal pump working under favorable conditions can produce 300 tons an hour. In one year a pump working continuously at this rate will produce 2,625,000 tons, so that if transportation as an item of cost could be neglected, one plant in each state could conceivably satisfy the entire demand.

Effect of Transportation Charges

To study the effect of transportation charges, it is necessary to assume some relationship between cost of production and volume of production. For this purpose, Fig. 1, based in part on figures from actual plants, was prepared. The curve represents the cost of producing sand and gravel with efficient pumping plants. At 2,400,000 tons production, it is assumed that the plant cost $150,000 and that it is necessary to pay $20,000 a year for leases. State royalties, sales costs and overhead are neglected and no allowance is made for loss through discarding material into the river and later repumping it. Under these circumstances the cost is barely 5c per ton. With a somewhat smaller plant and lower lease payments a production of 600,000 tons a year gives a cost of 12c per ton while a production of 150,000 tons gives 24½c; there are actually very few plants in Kansas which have 150,000 tons annual production. The ultimate low production condition is assumed to be an output of 750 car loads per year, since below that figure it is impossible over a period of years to pay sales costs and overhead on a plant capable of producing all types of washed material. Under these assumptions the minimum direct charges are:

Annual tons	Production cars	Portion of State's total	Cost
2,400,000	48,000	whole	5¼c
1,200,000	24,000	½	8¼c
600,000	12,000	¼	12c
300,000	6,000	⅛	17½c
150,000	3,000	1/16	24½c
75,000	1,500	1/32	39½c
37,500	750	1/64	59c

The freight schedule effective in Kansas and Oklahoma until recently was as follows:

Distance in miles	Freight charges per net ton. Single haul	Joint haul
0 to 10	$0.50	$0.65
10 to 20	0.56	0.71
20 to 30	0.62	0.77
30 to 40	0.68	0.83
40 to 50	0.74	0.89
50 to 60	0.80	0.95
60 to 70	0.85	1.00
70 to 80	0.90	1.05
80 to 90	0.95	1.10
90 to 100	1.00	1.15
100 to 110	1.05	1.20
110 to 120	1.10	1.25
120 to 130	1.15	1.30
130 to 140	1.20	1.35
140 to 150	1.25	1.40
150 to 160	1.30	1.40
160 to 170	1.35	1.45
170 to 180	1.40	1.50
180 to 190	1.45	1.55
190 to 200	1.50	1.60
200 to 230	1.60	1.70
230 to 260	1.70	1.80
260 to 290	1.80	1.90
290 to 320	1.90	2.00
320 to 350	2.00	2.05
350 to 380	2.10	2.15

The state of Kansas, 400 miles long by 200 miles wide, is typical. If this area be divided into two squares 200 miles on a side, it will be found that the average haul from an imaginary plant in the center of each, to all points therein, will be about 80 miles. Supposing the demand to be uniform all over the state the production of each plant would be 1,200,000 tons annually. If each square were split into four, annual production at each plant would be 300,000 and average haul 40 miles. Tabulating we have:

No. plants	Annual production, tons per plant	Production cost	dif.	Avg. haul miles	Approx. freight single haul	dif.
2	1,200,000	8¼c	3¾c	80	92½c	11½c
4	600,000	12c	5½c	56½	81c	10c
8	300,000	17½c	6½c	40	71c	7c
16	150,000	24½c	15½c	28¼	64c	5c
32	78,000	39½c	19½c	20	59c	4c
64	.....	59c	.....	14⅛	55c	...

It will be noted that as the production of the plant is increased there is at first a great saving in unit production cost with an increase of territory served, while the average increase in freight charges per ton advances but slowly. With larger productions the drop in production costs becomes less marked, while freight charges increase until in passing from 150,000 tons to 300,000 tons production, the increased freight, when figured on a basis of uniform distribution of consumption, increases enough to more than balance the operating saving. Accordingly, if the demand for sand and gravel in Kansas were uniformly distributed it could be best supplied in so-called "normal" times by 16 plants each producing annually some 150,000 tons.

Effect of Population on Demand

The demand for construction materials is not uniformly distributed. Each year it varies with highway programs, discovery of oil and many other influences. Over any considerable period of time, however, it will be found to vary with the density of population, tending, until very recently, to become heavier per capita in the larger cities. The population of Kansas in 1928 was 1,838,000 so that, neglecting the tendency of the cities to consume more than their share of aggregate, it develops that a 150,000 ton plant should serve 115,000 population.

There are three points in Kansas where a population of approximately this size is found in a single county, namely, at Kansas City, Kan. (Wyandotte county), Wichita (Sedgwick county) and Topeka (Shawnee county). Furthermore in a radius of 50 miles of each of these points there is a total population of 230,000, and within an area, so distributed that each center can supply it at an average haul of 40 miles or so, is a population of 460,000. The average transportation charge amounts to about 75c per ton while the cost of operation, at a production suitable to this population, can be brought down (under the assumption just made) to 12c, a total cost of 87c per ton. It will be noted that the "average" 150,000-ton plant first discussed had a total average cost of 88c a ton, so that the large city plant just described could compete with such a plant at a radius of 100 miles, by averaging its charges and absorbing freight. It should be noted, however, that by so doing it raises its cost at point of production to 87c, instead of 74c (which corresponds to a production of 150,000 tons at a delivery cost of 50c) or 78c, which would have been the approximate average had the production been held down to 300,000 tons and no attempt made to extend beyond 50 miles radius.

No single plant in Kansas produces today at or near the volumes here assumed, but the relations hold good and at present the three principal centers, Kansas City (including Holliday, Frisbie, and Argentine), Topeka, and Wichita have attained a dominating position in three areas approximately shown in Fig. 2. These trade territories include about half the area and three quarters of the population of the state. If there were no other centers of population, these locations would be utilized by sand companies almost to the exclusion of all others.

There are, however, numerous counties where populations of 25,000 or more are immediately adjacent to some tributary of the Kaw (Kansas) or Arkansas rivers. Such a population can absorb over 30,000 tons annually and provides a "back log" for a small plant. At points on trackage and ten miles or more from such a plant, if there is no "joint" haul, the big city plants can compete; but where the small plant can deliver direct by truck, unless the haul is long enough to offset the charges incurred in transshipment, the big plant is at a disadvantage. As a result there are numerous small plants at points well out from the main centers. Their location is sound and they should prosper, always provided that too many do not try to support themselves by supplying the same population.

Effect of "Averaging" Delivered Prices

Mention has already been made of the custom of "averaging" costs and prices so that profits made on "close in" customers help pay for extension of trade territory. Some outlying plant or plants may be competing, and as already indicated, by averaging, the cost delivered on siding may work out at 87c, although the siding may be 95 miles from the plant and the true cost be $1.12 per ton. To even up, 87c must be obtained for material sold in town, which actually costs 74c or less. Where this state of affairs exists an opening is made for competitors at home, and they are quick to take advantage. This is particularly true where a competitor can specialize in serving some particular district or group of contractors, thus lowering sales costs and delivery costs to the job.

West of the territory normally served by Topeka and north of that served by Wichita is an area with a population of 155,000 but about 110 by 140 miles in extent. In this area the railroads all run east and west, parallel to the rivers. There is no suitable central point for distribution, and except on trackage, truck hauls rather than railroad rates govern. There is a rarely heavy concentration of population in four counties in the central north and south strip, and the district can possibly support from two to four small plants.

West of this district lie the so-called "High Plains," once considered unfit for habitation, and even today rather sparsely populated. The chief demand in this district is for Federal and State aid road construction. This demand may be quite heavy, in a given county for a short period, but the heaviest permanent demand in the district is only about 40,000 tons annually in an area 75 miles square. It is very doubtful whether the area as a whole offers adequate inducement for the establishment of permanent classification plants.

Very Much "Over-Planted"

It will be seen that the entire state of Kansas (and conditions in Oklahoma and Nebraska are very similar) can be served by three plants located at each of the three large producing centers, from two to four with a production of 150,000 tons in the Great Bend-Osborn "Wheat Belt," perhaps eight or ten in the more populous counties with a gross production of 600,000 tons, and some small temporary plants or roadside pits in the High Plains area. Actually, instead of the 16 or 17 plants indicated, there are more nearly 260; indeed there have been many small plants the very existence of which was unknown, even to competitors. Many of these economically superfluous enterprises have been founded as a result of poor business foresight. Others have been successful, and if not economically necessary are nevertheless commercially justifiable.

Plants of the first class are generally installed to fill some unusual or exceptional demand, and there is often evidence of political influence. A typical case is that of a plant that is said to have cost its promoters over $50,000, which has undoubtedly cost its creditors more than that amount, and in various ways has cost its competitors close to $100,000. This plant, according to the statement of one of its original backers, was justified by "political connections" and an impend-

Editor's Note

HERE IS an excellent analysis of the sand and gravel industry's status in a very considerable part (geographically) of this country by an unbiased engineer.

It points out the mistakes made by producers in the past because they failed to recognize self-evident facts; it shows how the producers were on the way to rectify these errors; it explains the practical annihilation of an industry normally contributing $100,000 a year to the state treasury, and providing an honest living for many self - respecting workmen, through uncalled for and unfair competition by government for political reasons.

The article suggests that there was hope in NRA, as conceived, of correcting some of these errors of economic and political judgment. The article should be helpful and stimulating to all producers everywhere in the great fight ahead of them for fair and equitable treatment, even though it is too much to expect honorable treatment from politicians.

—THE EDITOR.

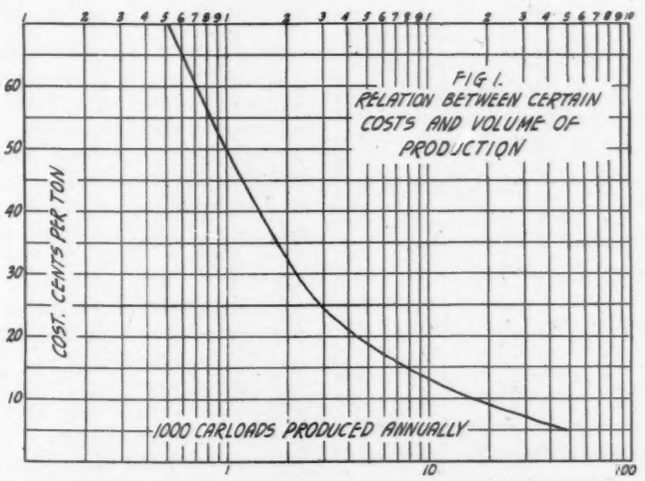


Fig. 1—Plotted on a logarithmic scale to show relationship of cost per ton and volume

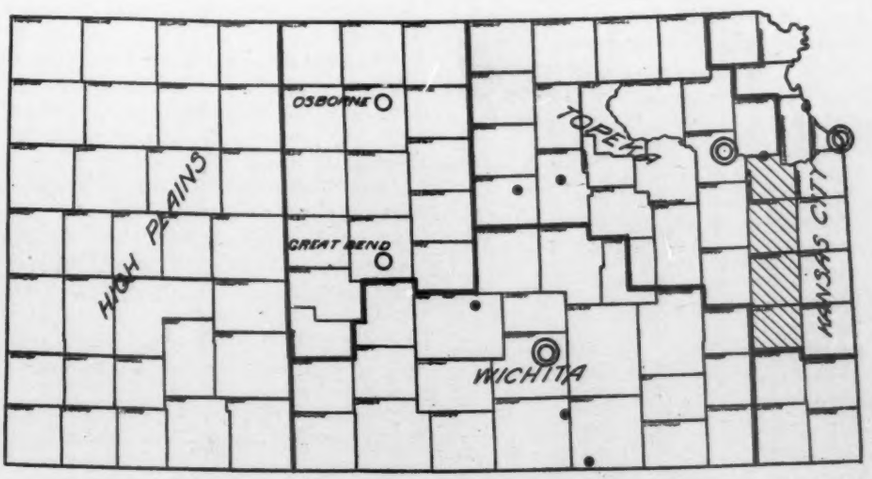


Fig. 2—Map of state of Kansas showing principal market centers

ing "large bond issue." The issue in question was defeated, but even had it succeeded, it would not have provided an adequate justification for an additional plant.

Commercially Justifiable "Extra" Plants

The second type of plant has already been mentioned, in connection with the averaging of costs. There are many places in the larger centers, where a small, carefully designed and conservatively managed plant can cater to one district, one class of trade, or one group of contractors in such a way as to keep its total cost, including sales and overhead, below that of its larger rivals. Likewise in the country districts "road gravel," which is an important item, but which does not have to be entirely free from mud, can often be produced more cheaply from some small local pit, than from larger and more complete washing plants. As a result of these encroachments there are more plants than are needed, and the production of each is curtailed. Furthermore, where only one plant supplies a given district, the customers always believe that they are paying too high a price and invariably a second and sometimes a third plant is started. In some cases companies start additional and unnecessary plants to gain slight advantages in freight rates. Where a joint haul with its 15c penalty is eliminated, this generally pays, but the result is increasing duplication, lower unit production and higher costs. During good times, most successful plants west of the Kansas City district have enjoyed productions of from 1000 to 2000 cars per year, but consolidations can be made which will permit productions of 6000 cars at certain points.

This condition of too much capacity is bad from every point of view, but as so far outlined it differs in no essential from that existing in petroleum, copper, coal, cement and automobile production; and it also applies to corn, wheat, pork and beef.

Unnecessary Production by Government

There was, however, in 1929 one very important difference. This lay in the fact that the heaviest single consumer of sand and gravel in each of the three Plains States was the state itself. As general business declined political pressure began to develop and highway engineers were asked simultaneously to build more roads, to put men to work to build better roads to attract tourists and to spend less money and help reduce taxes.

It was, and still is, also suggested that road building should cease entirely and that gasoline taxes should be diverted to charity funds.

Each group of state officials solved this problem in its own way. Some of the results which affected the sand industry included radical changes in specifications and types of construction, failure to collect gasoline taxes, anticipation of revenue, followed by refusal of banks to accept warrants, growth of "snowbird" plants dependent on truck transportation, and finally the establishment of city and county plants, operated by otherwise unemployed labor.

A typical case of radical change in construction policy was involved when the Kansas State Highway Commission decided to push the construction of "bituminous blotter" roads. The aggregate specified for this type of surface was:

Passing 1-in. sieve	100%
Passing ¾-in. not less than	95%
Retained on 8-mesh	25 to 50%
Retained on 28-mesh not more than	75%
Retained on 100-mesh not more than	85%
Passing 200-mesh	12 to 20%

It was said that the sizes specified were all within the range actually found in the river sands and, therefore, it was assumed that sand companies could produce this material. Reference to the analyses of the Blue gravels of the Kaw river given in the first article of this series,* will show that the material as commonly recovered is as follows:

	Cum.	Dif.
On ¾-in. sieve	1%	1%
On ⅜-in.	2%	
On 4-mesh	8%	6%
On 8-mesh	33%	25%
On 14-mesh	60%	27%
On 28-mesh	80%	20%
On 48-mesh	93%	13%
On 100-mesh	99%	6%

It will be seen at once that this material is deficient in "on ¾-in.," that it contains too much medium fine material (through 28 and on 100-mesh), and that, as any practical sand man knows, there is no chance whatever of recovering 15% of material passing 200-mesh. It was further demanded that the fine material should not be clay and should not "ball up" when damp.

To have produced the coarser portion of this aggregate by pumping would have required the handling of over seven tons of material for every ton produced; and the waste, although a usable sand, could not have been sold in the quantities produced. The only practicable method was the addition of crushed rock, and the further addition of fine silt or loess to obtain the material through 200-mesh. None of the sand and gravel plants was equipped to produce this material economically; and they received very few contracts.

The general decline of demand had made highway work almost the sole outlet for aggregate; and the sand industry, representing an investment of about two million dollars, was left without a market.

"Blotter" material was produced at crushed rock quarries (particularly where old waste piles could be robbed) and "chat" was extensively used. Curiously enough, however, material from wayside pits was also very freely accepted. Total production of sand and gravel in 1932 was only 1,724,987 tons, and of this total only 532,536 was shipped from regularly established plants.

Difficulties relative to gasoline taxes and uncashable warrants have not been peculiar to the Plains States.

*Rock Products, April 23, 1932, p. 22.

Production at a Loss Could Not Meet Government Competition

Neither are these states the only ones in which trucking at a loss has had serious consequence. Simply as a matter of history, however, it may be worthwhile to record that toward the close of 1932, 125-hp. gasoline engines in first-class condition could be bought from bankrupt oil well contractors for one dollar per horsepower; and that there is one case credibly reported in which sand was trucked by contract 57 miles for 95c per cu. yd.—eleven miles per ton mile, on a one-way haul.

The climax was reached when, during the winter of 1933-34, emergency employment funds were supplied to many of the larger cities *for use as wages only*. Obviously if the unemployed were to work effectively, some materials had to be used, and to obtain them without cost other than labor, various counties and municipalities opened new quarries and pumping plants to obtain aggregates.

In February, 1934, established sand and gravel plants were paying close to one hundred thousand dollars a year in taxes, not to mention contributions of various types, and these taxes were being used in part to operate "relief quarries." The legitimate industry was practically dead, and such sand as was moved was quite generally sold for less than the power cost of pumping.

There Was Hope in the NRA

We are now in the process of endeavoring to reconstruct the industry along the lines suggested by the National Industrial Recovery Act. The passage of that act may perhaps be a milestone in the history of American government, but it is not a magic formula. Like a football rule book it tells how the game should be played, but it does not provide customers, nor does it guarantee that all the players will win, or that they will all escape injury. The overshadowing problem is the necessity for a more reliable market. (This was writtten before the recent Supreme Court decision.)

The various agricultural relief measures have been wholly ineffective so far as restoring the purchasing power of the farmer is concerned, for while prices are up, production is down. So long as farm incomes from products and petroleum remain as at the present, the Plains States, as a group, lack purchasing power and there is little likelihood of any great pick-up in private construction, or railroad maintenance. Highway construction and other public works represent almost the entire demand, and must do so for some months to come.

The immediate future of the various aggregate groups, therefore, depends very largely on the policies of those in charge of emergency construction. In 1930 the aggregate plants of the Plains District showed a tendency to increase their investments and to develop large well-equipped plants at points where economic studies indicated some assur-

ance of permanence. Granted reasonably stable specifications and a fairly steady demand, this tendency will again become evident. If on the contrary, "political" considerations are to govern, if specifications, methods of inspection and monthly demand for material are to be arbitrarily altered, the only answer possible is the temporary plant. In the long run the aggregate men as a group can exercise considerable influence on governmental policies toward their industry. Indeed much of the trouble, past and present, has resulted from one group or another endeavoring to occupy "the driver's seat" to the exclusion of the rest. No industry or group can expect to survive by developing to four times normal capacity and then lying idle, while waiting for its "turn." Steady demand means efficient, well-equipped plants capable of producing material which will stand rigid inspection, while intermittent demand means the reverse. It would appear that permanence of the aggregate plants as producers depends in part on ability of each to specialize on its own best market, and permit others to do likewise. It also begins to look as though an increase in private rather than public construction will be necessary if the industry is to regain a sound basis.

Loading gravel chips direct to railway cars at new plant of the American Sand and Gravel Co., Hattiesburg, Miss.

Flint Pebble Products

American Sand and Gravel Co., Hattiesburg, Miss., has a new dredging operation. Its deposit is 85 ft. in thickness with an average of 5 or 6 ft. overburden. The deposit is an unusual one, being practically devoid of sand, and consisting of over 90% flint pebbles. A dredge boat 26 ft. by 50 ft. is equipped with a 10-in. Morris pump, direct-connected to a 200-hp. G.-E. motor. The material is pumped to the screening plant under a 40-ft. bend. Tyler square-mesh screen cloth of sizes to fit the specifications, is used on the double-deck flat screens. The top deck singles out the gravel for concrete (¼-in. to 1½-in.), which goes to bins direct for truck or railroad loading. The material below ¼-in. passes down a wooden launder to waste in a sump. If there should be a demand for such material, the dredge is moved over and it is pumped out. When crushed gravel is desired for bituminous surfacing, all above ¾-in. passes down a wooden chute to a Kennedy gyratory, gearless crusher, No. 19, driven by 30 hp. G.-E. motor. This crusher has a 6-in. shaft and a rated crushing capacity of 300 tons per 8-hr. day. The crushed gravel discharges below into a ½-cu. yd. hopper feeding a bucket conveyor which takes the material to a wet screening plant. The conveyor has 30-ft. pulley centers and has sufficient buckets and operating speed to keep the small hopper empty at all times. The conveyor consists of a 10-in. rubber belt with buckets bolted on, and is inclined to a 45-deg. angle. This material is discharged into a Robins double-deck vibrating screen with screen surfaces 4 ft. by 7½ ft. Sizes from ½-in. down to No. 10 mesh are taken out and emptied into the sump, and sizes from ½-in. to ¾-in. are emptied direct into railroad cars, without any intermediate storage. A 5-in. Dean-Hill pressure pump supplies the wash water for the complete operation, at the rate of 550 g.p.m., under a 55-ft. head. The plant has about 140 acres of material, of which 10 have been worked to a depth of 85 ft.

Temporary Plant

McGrath Sand and Gravel Co., Lincoln, Ill., operated last summer a new small plant on the Whitman property near Banner, Ill., to supply concrete aggregates for state highway No. 100.

American Sand and Gravel Co.'s new plant, Hattiesburg, Miss. Sand stored on edge of pit to be repumped on demand

Modernization by Carbon Limestone Company

From Quarry to Shipping Facilities for Forty Sizes of Crushed Stone

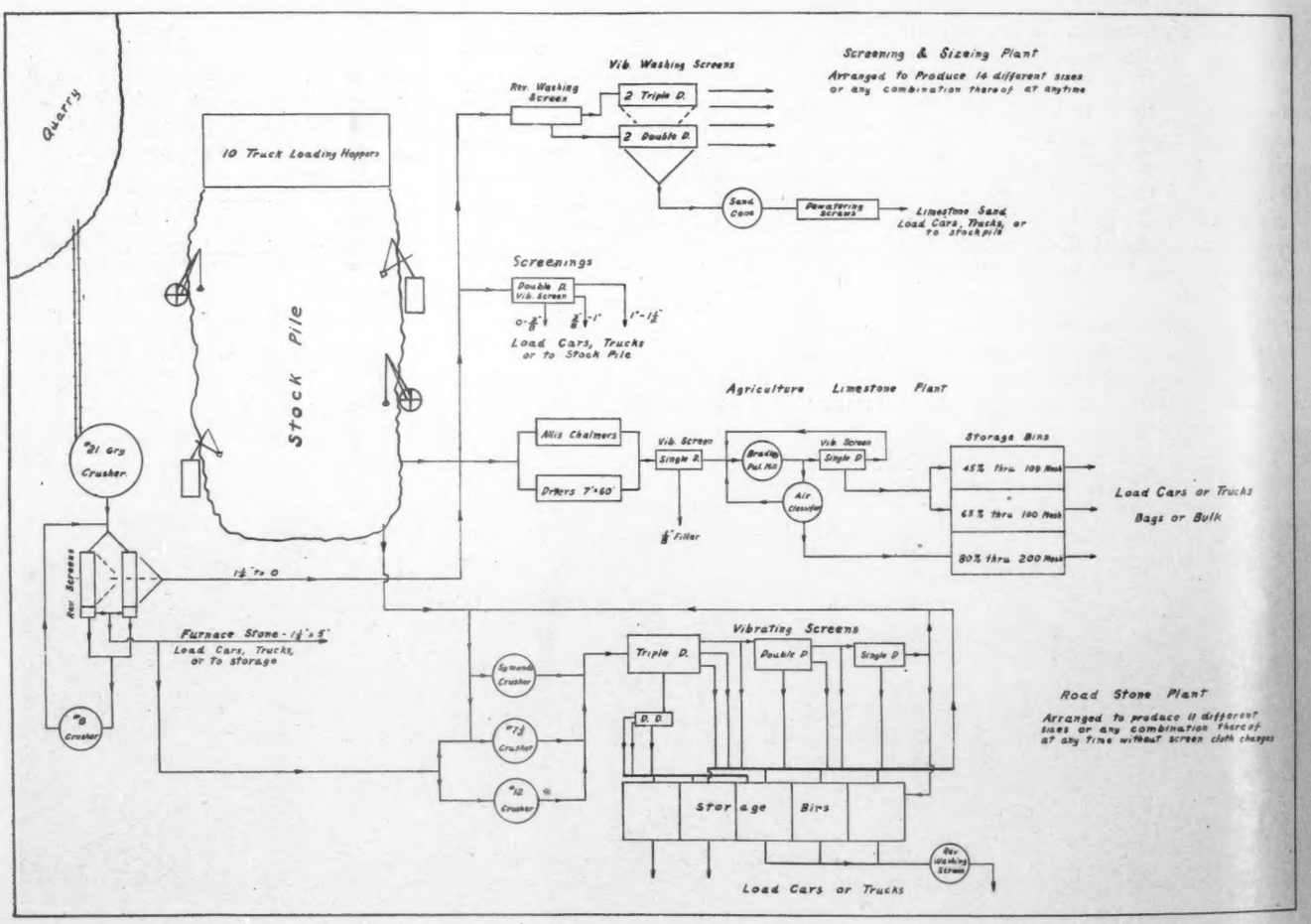
THE CARBON LIMESTONE CO. plant at Hillsville, Penn., has installed a Scaife water softener (lime-soda treatment) for use on feed water for the boilers. About 250,000 gal. of water is treated per day. The tubes of the eighteen boilers used are cleaned now every three months instead of every week or two. Approximately 80% of boiler repairs has been saved, and a 30% saving in fuel has resulted.

Rotary screens were recently replaced by vibrating and shaker screens in the commercial plant to increase production and give greater flexibility in addition to more sizes of finished product. Production in the commercial plant has been stepped up to 240 tons per hour—which can be washed. Some 850,000 gal. of water daily is used for washing.

The location of the plant requires great flexibility in operations and in sizing equipment, in order to meet highway specifications of West Virginia, Pennsylvania, Ohio and New York. With the present set-up, forty sizes of aggregate can be furnished, ranging from 5 in. down to 200 mesh.

Five 60-ton steel loading bins were erected recently for loading trucks. A standard-gauge car carries stone from stock pile or

Six-yard steam shovel casting stripping over edge of pit

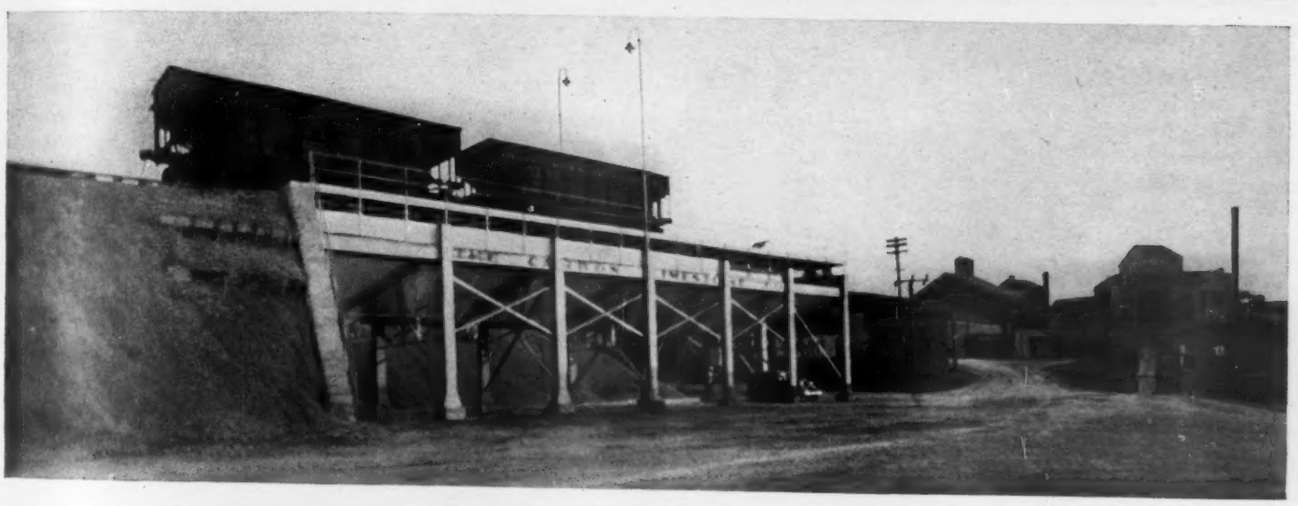


Flow sheet of the commercial stone plant of the Carbon Limestone Co., where 40 sizes of crushed stone are produced

bins and discharges into these bins. With the new addition, the company has bins for keeping twenty sizes of stone stored at any one time.

The method of quarrying was recently changed. This operation has always been handicapped by an extraordinary amount of overburden year in and year out. Probably more overburden is handled per ton of limestone produced than in any similar operation in this country. This overburden is 40 to 60 ft. deep and the limestone itself averages only 20 ft.

To obtain the utmost economy, very large (for quarry work) shovels are used—two Marion, Model 300, using 6-yd. buckets. The quarry is roughly circular or oval in plan. The stone has been removed from the center. The shovels then strip a ring or path about 110 ft. wide around the circular excavation, casting the stripping into this excavation. Drilling and blasting follows the stripping operation; the shovel loading rock, working on the lower level, loads cars on top of the limestone, 20 ft. above.



Above—Typical new screen installation. Center—New truck loading bins served by hopper bottom cars. Below—New commercial stone plant

Florida's Newest Hard Rock Phosphate Plant

Hydraulic Stripping—Rock Mined Above and Below Water Level—Crushed Stone By-product

By Bror Nordberg,
Associate Editor, Rock Products

THE DUNNELLON PHOSPHATE MINING CO. has been operating a new plant at a new location near Hernando, Fla., for the last 12 months.

The Deposit

The deposit is a variable hard rock deposit from 10 to 50 ft. in thickness. The overburden varies considerably, in some places being practically nil and in others up to 40 or 50 ft. In certain parts of the mine being worked, the deposit is near the surface and is mixed clay, while in other parts the deposit is deep, with an overburden of 40 ft. and is inter-mixed with a great deal of heavy clay.

Mining Equipment

The working area is equipped with two dredges and one Link-Belt 1-yd. gasoline shovel. Stripping (40 ft. now) ahead of the operation is accomplished by use of a hydraulic monitor, operating under 200 lb. pressure and supplied by a 3-stage De Laval 10-in. pump driven by a 250-hp. General Electric motor. The stripped material is pumped from a sump by an 8-in. Maddox Iron Works pump and is discharged about ½ mile away. This pump is driven by a 150-hp. G-E motor.

Wherever the phosphate can be mined above the water level, the Link-Belt shovel is used to load the rock into 2-ton dump cars running on 30-in. gauge rails. A 350-ft. incline carries the rock to the top of the washing plant (elevation 65 ft.). The track is laid on the floor of the mine up to the shovel, and double track is laid on the incline to permit one car to pass another.

Where the deposit is below the water level, 1½-yd. dipper dredges, built locally, are used to load similar cars, which run on the inclines, built on 50-ft. piling over the water to the dredge boat. Two dredges are being operated now. These dredges are made of steel, and power is supplied by a steam engine, made by Tampa Machine and Foundry Works, operating under 125-lb. pressure. An incline is run out to each operating point, each with a slope of 20 deg. The incline will vary in length up to 1400 ft. eventually. Whenever large rock is handled, it is blasted in the dippers before it is dumped into the cars. On rocks up to ½ ton, 3 lb. of explosive (40% dynamite) is used. A friction Maddox hoist pulls all cars to the top of the plant.

The Plant

The cars discharge directly on to a 10-in. stationary grizzly. Water under pressure is used to wash out the cars at all times. When the clay is running heavy, men with pick-axes break it up and push it through the 10-in. openings. Phosphate rocks of over 10-in. size are pushed into a Maddox single roll crusher, which crushes to 5 in. Very large rock are hoisted into this crusher.

Large rock other than phosphate rock are pushed on to a chain belt (home-made) and carried out over a 150-ft. wooden overhead structure and dumped in a pile.

After passing the grizzly, everything goes to a separator (3-in. openings). The clay is carried out to a dump by cars and deposited. A Robins 36-in. belt carries it then to a second 36-in. Maddox crusher (2 in. sizes). Then it goes to the first set of 30-ft. log washers, which have 87 paddles on each log. These are made by Maddox Iron Works. Then it passes to a second set of log washers 20 ft. long.

New plant of the Dunnellon Phosphate Mining Co., Hernando, Fla., where hard rock is stripped by hydraulic methods and mined with a dipper dredge

Three thousand gallons of water per minute are added in the log washers.

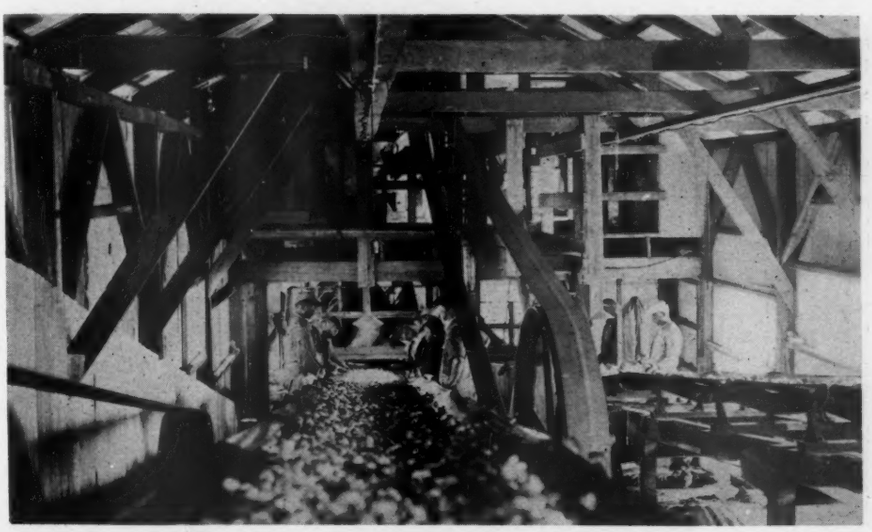
From the second set of log washers, the rock goes to a 15x6-ft. Maddox cylindrical separating screen with 1½-in. openings. The throughs go to a 16-ft. rinser, where the outside jacket has 1/16-in. openings and the inside jacket has ½x1-in. openings. The sizes below ½ in. drop to the outside jacket and on to an 18-in. Robins belt. Sizes between ½ in. and 1½ in. go to a 36-in. Robins belt. Similarly, the sizes over 1½ in., separated out before, pass through a chute to a 36-in. Robins belt.

The three belts pass parallel through the picking room where undesirable rock (flint, sand-lime, limestone, clay balls, etc.) is picked out by hand. The sizes below ½ in. are not picked, so the belt travels at a fast speed. Ten pickers work on the ½-1½-in. rock belt and four on the larger sized rock. These two belts travel at approximately 20 ft. per minute to enable the pickers to do a good job. Approximately 20 tons of undesirable rock is picked out per day, which falls below in a trough to a car which is hauled out to a dump pile. This rock is stock-piled and can be used for road work if there is a demand.

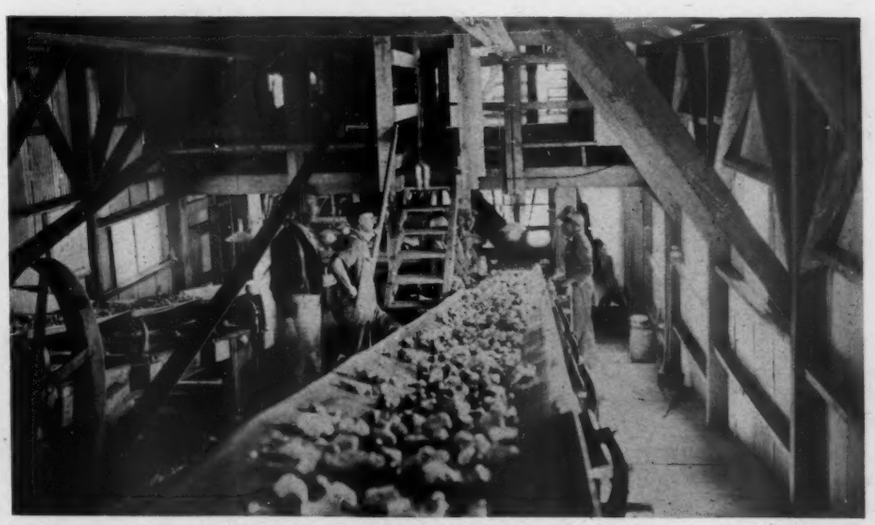
Rock from all three belts discharge at the conveyor belt ends into a loading bin which discharges directly into cars. Provision has been made (by two 36-in. gauge tracks) so that rock can either be stock-piled or hauled over a trestle (300 ft.) into a 5-car railroad bin over the Seaboard railway track.

Water for the plant is pumped by two Sterling 10-in. deep-well pumps, each furnishing 2000 g.p.m. The wells are 105 ft. deep. Each pump is driven by a 75-hp. G-E induction motor, running at 1800 r.p.m.

Grizzly, showing clay lumps removed here



Picking belt for removal of impurities



Another view of the two picking belts

Rock Phosphate Industry News

Swann Chemical Co., Birmingham, Ala.: Changes of name and consolidation of activities of Monsanto Chemical Co.'s Swann Chemical Co. subsidiaries, were announced recently by Edgar M. Queeny, president. Administrative and sales offices of the Swann company with a subsidiary in Alabama have been moved to St. Louis and the Swann company's name has been changed to Monsanto Chemical Co. of Alabama.

◈ ◈ ◈

Anaconda Mining Co, Conda, Idaho, has broken through the mountain into which it has been tunneling since 1925, except for a 20-month shut-down in 1932-33. A 540-ft. raise from the inner or eastern end of the 8200-ft. main haulage tunnel connects with a 2400-ft. drift on the ore bed, driven from the opposite side of the range. The Conda mine has been producing about 45,000 tons of phosphate annually since 1921 from the west bed. This new development will make available several millions of tons in the east phosphate bed, according to E. M. Norris, superintendent.

Beginning of the Washington (State) Talc Industry

By Hermann Merten,
Marble Mount, Wash.

EFFORTS to gain recognition for the state of Washington in the talc industry were futile for a time in spite of prevailing abundance of quality mineral. Inaccessability, transportation by Indian canoes and later by steamboat from the upper Skagit river, forced costs upon the pioneer miners which could not compete with those of the well-established Eastern or California producers. Operation was not profitable; locations soon were abandoned; tunnels and diggings with their promising wealth crumbled again under new slides; equipments deteriorated and gradually vanished from the rugged foothills along the Skagit river about six miles north of the small town of Marble Mount.

About five years ago, two men descended a mountain side some 200 ft. on the south bank of the Skagit, only a few miles upstream from those pioneers' diggings on the north side of this river. They were weary and almost melting with perspiration under the burden of a heavily laden stretcher. Yet they smiled, victoriously. They had struck it—struck it right—in every way, because there was now a bridge connecting with daily railroad service on the other side of the river and the trackage of a logging road a quarter of a mile (half way) up to their location.

Quietly, with patience and perseverance, with the crudest of hand tools, these men had penetrated the mountainside in pursuit of an excellent talc lead. The sale of novelties, pencils, cake griddles, etc., masterly finished by hand, essentially helped to defray expenses for the development of the mine to that point where all doubts as to volume and quality of the deposit could safely be dismissed.

So starts the history of the talc industry in the state of Washington with the humble task of these two men carrying upon a stretcher a large block of talc, the final test and proof of their property values, because the convincing quality of this sample won recognition for Washington talc in the industry and established a favorable reception in the commercial field for Skagit Talc Mines.

Under conservative planning, necessary improvements were made, like the grading of a truck road to the river bridge, buildings set up and machinery installed; production started on a small basis, while the quality of the talc was creating increasing demand in the western paper industry.

Above—The Skagit river, on both sides of which are vast talc deposits. Right—View of talc plant which is working on "composition products"

Skagit talc is mined underground. A horizontal tunnel leads into the mountain side. The deposit spreads and a so-called chamber is created by cutting the talc out in layers of blocks with a "Post channeler" (Radiolax coal mine) machine. This first chamber for instance measures 20x70 ft. and affords entrance to a succession of similar chambers on the same or different elevation. For the purpose of safety the dimensions of these chambers are held down and each is supported by partitions or heavy pillars of the original formation, while for particular precaution all "overhead" is timbered.

However, this method of cutting blocks with the Post channeler soon proved itself inadequate to the steadily growing requirements of the paper industry, which now choose and demand more and more Washington talc for furnace lining. This system was also economically impracticable for quantity-price-production at high standard of workmanship, since four men operating each Post channeler could produce only about 50 cu. ft. in 8 hours.

Talc Saw Developed

So was born, evidently out of sheer necessity, an efficient saw for mining talc, a saw that eliminates waste of material, time, labor and fuel, for it is operated by one man and produces from 150 to 200 cu. ft. of talc in 8 hours. It is the invention of Hiram McLean on which patents are pending.

The saw-blade is standard by Diston, with corundum teeth. Facing the talc wall, operator will first post the machine on the extreme right side and by means of a lever raise the extending saw arm to cut perpendicularly; then repeat the same operation on the extreme left side (which will determine the extent of the planned chamber). He now releases the lever and turns it for horizontal adjustment of the saw and cuts

(horizontally) between the two perpendicular grooves and then repeats this procedure with a parallel cut 18 in. higher.

There is no limitation to the extent of the horizontal cut, but layers of about 7 ft. are most easily handled. Since the saw is adjusted to penetrate the talc to a depth of 18 in., and it is understood that all cutting is being done across grain of the talc, it follows that on account of the ½ in. grooves left by the perpendicular and horizontal cuts of 18-in. depth, the weight of the talc will break the layer smoothly in the back between upper and lower grooves. The blocks are then removed with ease and hauled on pushcarts through the tunnel. From here the blocks move one by one on to the shaping tables, where they are trimmed with precision by an automatic scaler. On account of the accuracy in the first cutting of the talc in the mine, waste of material is reduced to a minimum. Material not absolutely up to standard in every respect for furnace blocks is cut in smaller slabs and used for a newly created market, domestic stove and heater-lining, etc.

A 135-hp. Diesel unit, which has recently been installed to modernize operation for still greater economy and efficiency by furnishing electricity for light, power, air compressors, etc., throughout mine and general plant, now gives this enterprise an up-to-the-minute equipment adequate to the growing demand for its products.

Ben and Hiram McLean, founders of the business, are, with the capable collaboration of Bob Doxie as operation manager, the motivating spirits in the undertaking.

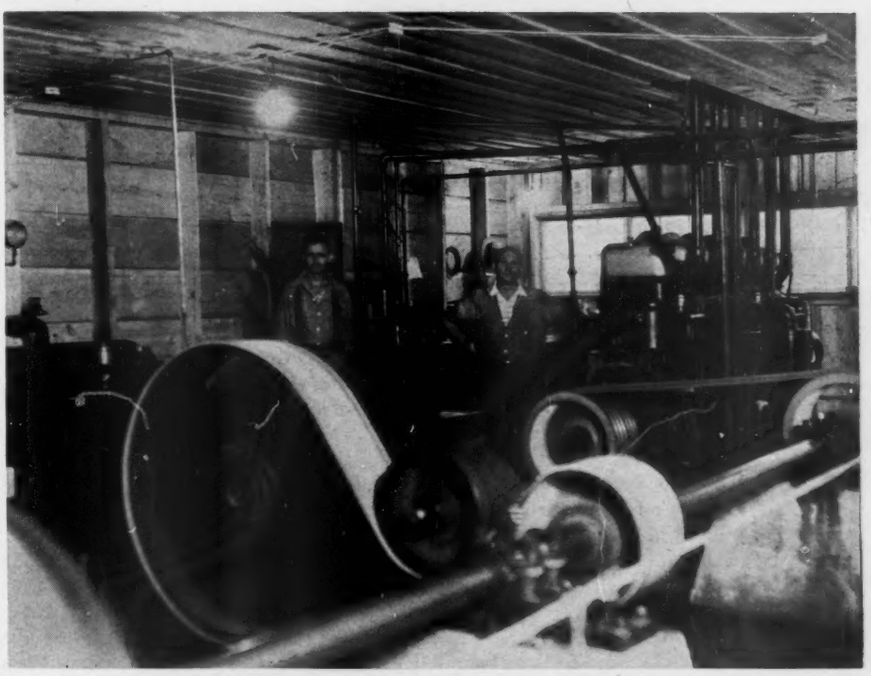
It should be only a question of reasonable time before this new Washington industry will branch out in its field, because analyses of the mineral in this stratum of immense volume show that it is suitable for the manufacture of cosmetic powders, filler powders and glazing powders for paper making, as well as recently discovered composition products of great promise.

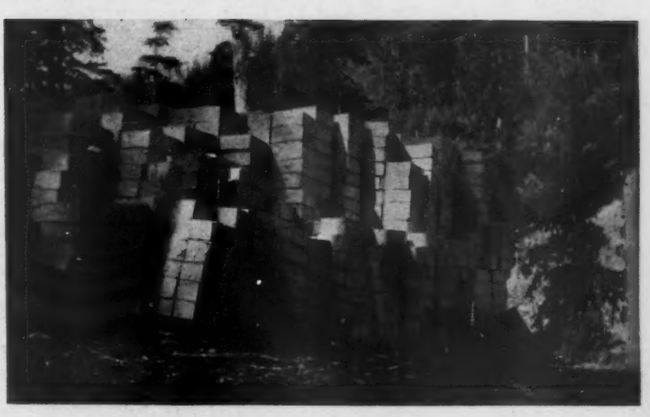
New Sand Producer

Fort Bend Sand and Gravel Co., Houston, Tex., has been organized by local men to develop sand and gravel deposits in the Brazos river near Richmond and Rosenberg. R. W. Rogers, Houston Building Material Co., is president; M. W. Kennon, Navarro Oil Co., is vice-president; T. L. Bauer, attorney, is secretary.

Marble Highway Stone

Willingham-Little Stone Co., Whitestone, Ga., whose specialty is terrazzo chips shipped to practically every state in the Union and to foreign countries as well—under normal conditions—is now engaged in furnishing 30,000 tons of crushed stone for a seven-mile paving job. This beautiful white marble has at least 25 special uses.





Top — View of plant for sawing talc products. Center—The new 135 - hp. Diesel engine in the power plant. Bottom—A pile of talc blocks worth about $6,000

Obsolescence of American Homes[1]

By Oliver Bowles[2] and Carl A. Gnam[3]

RESIDENTIAL BUILDING normally provides an immense market for building materials. The average annual outlay for construction classed as residential during the 5-year period 1925-29 is estimated at about 2½ billion dollars. Therefore, producers of mineral commodities used in building construction are interested in the extent to which homes are in need of repair or replacement, because the degree of obsolescence has a direct bearing upon the future market for materials.

Some pertinent facts regarding the present condition of residential structures in the United States are revealed in Real Property Inventory, 1934, which contains the results of a survey conducted by the Bureau of Foreign and Domestic Commerce with the assistance of the Civil Works Administration. The 64 cities canvassed range in size from Santa Fe, with a population of 11,176, to the Metropolitan District of Cleveland, with 1,194,989 inhabitants, and are representative of all sections of the country, there being at least one city from each state. The 1930 census gives the total population for these cities as 9,793,371, and this survey accounts for 9,074,783 persons, 2,612,107 families and 2,633,135 dwelling units. It would seem, therefore, that, with due regard for the usual shortcomings of such an undertaking, the data thus compiled are reasonably accurate indexes of conditions throughout the Nation.

Although the aggregate value of residences is great, a large part of it is made up of numerous small amounts representing the value of modest homes. Of the 860,465 owner-occupied, single-family dwellings covered in this survey, 64% range in value from $2,000 to $7,500.

In Table 1 the homes covered in this survey are grouped according to age. The figures in column 4 may surprise many readers because they show that, of the 1,923,953 buildings covered, 37.7% have been built for 25 years or longer, and that the peak period 1925-29 accounts for almost one-third of those built during the last 25 years. Contrasted with this, the number of homes under 5 years old is relatively small because building was at a low ebb during the depression period, 1930-34. A correction of this condition is reflected in the recent sharp advance in residential building.

During recent years, the number of homes in each age bracket has corresponded reasonably with the volume of residential building during those years, but for earlier years the correspondence is not so close because an indeterminate number of homes have been destroyed.

It is difficult to predict how many of these older homes, a substantial number of which were built over 40 years ago, will be replaced in the near future.

Many are in splendid condition and no doubt will be habitable for years to come. Others probably have suffered considerable deterioration. The incentive for replacement may not originate alone in a poor state of repair of the structure. The house may be well built and in good repair, but a desire for modernization, the encroachment of business on residential areas, a deterioration in social surroundings, or other factors may exert a powerful influence toward abandonment.

Modernization would become a stronger incentive if greater progress were made in methods and materials of construction. No major industry has shown less improvement, particularly in design, during the last 50 years, than residential building. The present trend toward prefabrication in larger units, which reduces the cost and the time required to erect a building, may promote an increasing volume of new construction.

In Table 1 the data have been assembled by geographic areas also. The cities included in each area are as follows: **New England**—Portland, Maine, Nashua, N. H., Burlington, Vt., Worcester, Mass., Providence, R. I., Waterbury, Conn.; **Middle Atlantic**—Binghamton and Syracuse, N. Y., Trenton, N. J., Erie, Penn.; **East North Central**—Cleveland and Zanesville, Ohio, Indianapolis, Ind., Peoria and Decatur, Ill., Lansing, Mich., Kenosha and Racine, Wis.; **West North Central**—Minneapolis and St. Paul, Minn., Des Moines, Iowa, Springfield and St. Joseph, Mo., Fargo, N. Dak., Sioux Falls, S. Dak., Lincoln, Neb., Topeka and Wichita, Kan.; **South Atlantic** — Wilmington, Del., Frederick and Hagerstown, Md., Richmond, Va., Wheeling, W. Va., Asheville and Greensboro, N. C., Charleston and Columbia, S. C., Atlanta, Ga., Jacksonville, Fla.; **East South Central**—Paducah, Ky., Knoxville, Tenn., Birmingham, Ala., Jackson, Miss.; **West South Central**—Little Rock, Ark., Baton Rouge and Shreveport, La., Oklahoma City, Okla., Austin, Dallas, and Wichita Falls, Tex.; **Mountain**—Butte, Mont., Boise, Idaho, Casper, Wyo., Pueblo, Colo., Albuquerque and Santa Fe, N. Mex., Phoenix, Ariz., Salt Lake City, Utah, Reno, Nev.; **Pacific**—Seattle, Wash., Portland, Oreg., Sacramento and San Diego, Calif.

It may be observed that the largest number of old houses is in New England. Such a condition is to be expected, because this area was settled by the early pioneers and both they and their descendents built sturdy and enduring homes. The rigors of the winter climate encouraged substantial building.

In the Midwestern States, one fourth to one third of the homes were built during the period 1915 to 1924. This great agricultural area enjoyed an era of prosperity during those years. In the South Central States, a relatively small number of homes are over 30 years old. In the East South Central area, the percentage of the total is 16.9, and in the West South Central section 13.5, whereas for the entire country this age bracket comprises 30% of the total. The table affords a basis for making further deductions relative to the age of homes in the various districts.

Table 2 shows the condition of structures and amount of repairing necessary in the 64 representative cities. Of greatest interest to producers of building materials is the finding that 15.7% of the homes are in need of major repairs and 2.3% are unfit for habitation. Of the structures covered in the survey, 345,641 are in need of replacement or major repairs. As the survey covered about 7% of the total population of the United States, it may be estimated roughly that about 14 times the above number, or approximately 4,800,000 residential structures, are in need of partial or complete rebuilding.

TABLE 2. CONDITION OF STRUCTURES IN THE UNITED STATES

		Per Cent
Total reported	1,929,212	100.0
Good condition	726,245	37.6
Minor repairs needed..	857,326	44.4
Major repairs needed.	301,740	15.7
Unfit for habitation...	43,901	2.3

In table 3, the condition of repair is shown by districts. Houses in the New England and Middle Atlantic areas make the best showing, with 89.7% in the former and 89.3% in the latter in good condition or in need of only minor repairs. As these areas show the largest percentage of old homes, it is evident that the oldest houses are not necessarily those in worst condition. The greatest need of repair and replacement is in the South Atlantic and East South Central areas; 23% of the houses in the former and 27.8% of those in the latter are suffering serious structural defects or are unfit for habitation. In the East South Central area, which makes the poorest showing, almost a third of the dwelling units were built during the last 10 years. This condition indicates a less substantial type of construction in the southern area than in New England and the Middle Atlantic States.

Measuring the Market

Although these figures show an extensive potential market for building materials, the need for replacement or repair may not alone

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[2]Supervising Engineer, Building Materials Section, U. S. Bureau of Mines.

[3]Building Materials Section, U. S. Bureau of Mines.

TABLE 1. REPORTED AGES OF STRUCTURES[1]

Period	Years	Number of Structures	%	New England %	Middle Atlantic %	South Atlantic %	East North Central %	East South Central %	West North Central %	West South Central %	Mountain %	Pacific %
1930-34	0- 4	128,501	6.7	6.5	5.7	5.8	5.6	5.2	6.0	9.6	6.7	9.1*
1925-29	5- 9	370,329	*19.2*	*14.0*	*17.2*	*17.3*	*18.4*	*26.9*	*16.1*	*24.8*	13.8	*24.9**
1920-24	10-14	263,664	13.7	8.2	11.1	12.4	13.4	14.8	13.7	20.3	12.1	15.8*
1915-19	15-19	233,978	12.2	7.9	10.7	11.4	12.4	13.3	12.6	14.3	12.1	13.7*
1910-14	20-24	202,432	10.5	7.1	8.3	11.1	9.3	12.5	11.0	10.9	10.2	13.3*
1905-09	25-29	147,673	7.7	5.8	5.8	7.7	7.3	10.4	8.5	6.6	8.0	8.9*
1900-05	30-34	187,307	9.7	9.3	8.6	12.2	9.5	5.4	9.8	8.1	*21.9*	7.4*
1895-99	35-39	80,576	4.2	6.1	5.0	3.8	5.0	3.6	5.2	1.7	4.6	2.4*
1885-94	40-49	158,778	8.3	12.5	12.2	8.3	10.0	5.4	11.0	2.5	7.6	3.3
1860-84	50-74	122,076	6.3	15.2	12.3	7.2	8.2	2.3	5.9	1.1	3.6	1.1
59	75+	28,639	1.5	7.4	3.1	2.8	.9	.2	.2	.1	.3	.1
Totals		1,923,953	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1]The term "structures" includes all buildings with residential units, except hotels, clubs, rooming houses, and summer cottages. Figures in italics indicate the greatest percent in the 5-year periods. *5-year intervals.

TABLE 3. CONDITIONS OF STRUCTURES BY GEOGRAPHIC AREAS

Geographic areas	—Total structures— Number	% of Total	——Good—— Number	%	Minor repairs needed Number	%	Major repairs needed Number	%	——Unfit—— Number	%
New England	173,418	9.0	76,407	44.1	79,177	45.6	16,531	9.5	1,303	0.8
Middle Atlantic	125,288	6.5	56,444	45.1	55,415	44.2	12,390	9.9	1,039	.8
South Atlantic	253,012	13.1	81,492	32.3	113,151	44.7	49,929	19.7	8,440	3.3
East North Central	396,735	20.6	151,053	38.1	179,449	45.2	56,642	14.3	9,591	2.4
East South Central	129,182	6.7	30,304	23.5	62,902	48.7	30,911	23.8	5,065	4.0
West North Central	305,242	15.8	122,191	40.0	130,959	42.9	46,722	15.3	5,370	1.8
West South Central	181,090	9.4	67,766	37.4	79,403	43.9	29,178	16.1	4,743	2.6
Mountain	89,119	4.6	33,199	37.3	37,251	41.7	16,021	18.0	2,648	3.0
Pacific	276,126	14.3	107,389	38.9	119,619	43.3	43,416	15.7	5,702	2.1

constitute a criterion of immediate market demands. Lack of buying power may delay seemingly necessary work. When owners of homes are in straitened circumstances, repairs or replacements may be deferred or temporary makeshift repairs may be substituted for more extensive and permanent renovation. Loans for repairs and new construction guaranteed by the Federal Government through the medium of the Federal Housing Administration are, no doubt, contributing materially to the recent upturn in residential building.

Mortgage Situation—Profit Motive to Be Considered

Promptness in making replacements and renovations is influenced to a certain degree by extent of ownership and mortgage encumbrance. Of the 1,536,806 single-family dwellings canvassed in this survey 56% were owner-occupied, and 44% were rented. Of the owner-occupied single-family dwellings, 54% were mortgaged.

Profit on rent is the landlord's incentive for repair and replacement of rented homes. When annual rentals drop to 5% of investment value, a condition quite common during the past 4 or 5 years, there is little incentive to renovate or replace. When rentals reach 10% of investment value, building is likely to become active. The increase in rents recently reported in some cities indicates a trend toward more favorable building conditions.

Although the influences that have delayed needed building and repairing for several years may continue in effect for a time, the potential market for building materials is significant because it becomes an actual market when circumstances favorable to building occur.

What Are Government's Plans for NRA?

THE MOST LOGICAL discussion that we have seen as to what the Washington administration "has up its sleeve" in connection with a revival of NRA is an article in a recent issue of the *Chicago Journal of Commerce* by its Washington correspondent, Henry D. Ralph, which says in part:

"Secretary Ickes may appear to be jumping the gun a little in dragging the anti-trust laws into the current controversy over the importation of German steel for PWA purposes.

"There is an uneasy feeling in business quarters in Washington that the administration is playing a waiting game in connection with the anti-trust laws and is not yet ready to spring any major prosecutions.

"As far as external appearances go the anti-trust laws have been a dead letter around the department of justice ever since the end of the NRA technically restored them to full force. The few cases that have been brought have not concerned any activities which were presumably permitted by NRA codes. Meanwhile Senator Borah and others have been shouting up and down the land that the burning issue is monopoly and restraint of trade.

"This convinces some of the side-line observers that the administration is quietly gathering evidence of wholesale violations of the anti-trust laws through continuation of code activities, whether or not specifically authorized by codes, particularly agreements and devices to eliminate severe price competition. This information will be held as a reserve club for use on industry when the time comes.

"If business men will coöperate with the administrator this winter in writing some sort of a new NRA law this club may not be used. What the administration wants is for business to demand a law for voluntary codes of fair competition but giving the government power to supervise wages and labor conditions and power to represent the consumer or the public interest in all agreements affecting prices, competition or trade practices.

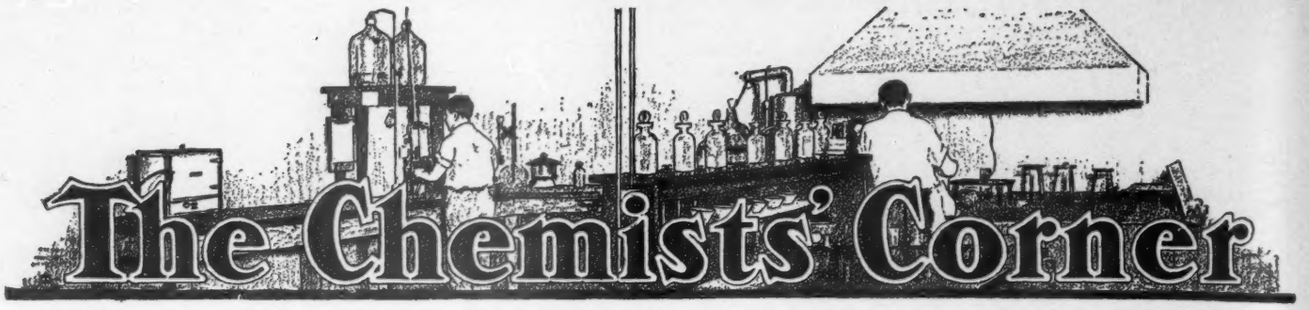
"Business will have this chance at Major Berry's conference December 9 and thereafter when congress begins talking about the subject. But if, as appears quite probable, organized business tells Major Berry politely but firmly that it wants no more of his NRA under any name or form, the anti-trust club may fall. The administration would then take the position that if business wants free and open competition it will have it with a vengeance, and the federal courts will be clogged with prosecutions of scores of different code-bred schemes for restraining trade as this term is defined by the anti-trust laws."

To Rebuild Helena with Earthquake-proof Dwellings

A TENTATIVE COMMITMENT to insure a mortgage not to exceed $200,000 for an earthquake-resistant, low-cost housing project in Helena, Mont., will be issued to a private limited dividend housing corporation to be known as the Helena Development Co., it is announced by Stewart McDonald, federal housing administrator.

The corporation will have assets consisting of suitable building sites, free of all liens and encumbrances, located and valued in a manner approved by the Montana Insuring Office of the Federal Housing Administration and in addition a cash capital deposited in an approved depository.

The proposed project will include 50 or more detached or semi-detached dwellings.



TWO STAGE vs. THREE STAGE GRINDING

By W. R. Chandler,
Chief Chemist, Idaho Portland Cement Co., Inkom, Idaho

THE EXPERIMENTS outlined in this article were made to determine the results which might be obtained from changing a two-compartment cement finish mill to one with three compartments. The change, obviously, is in the installation of a dividing partition, or diaphragm, located somewhere in the last, or second compartment of the present two-compartment mill. The expected results would be either to produce a cement of higher quality, maintaining rate of production the same; or, if the quality of the product is sufficiently good at present, to increase the rate of production.

In the past, two-compartment mills have been changed to three, and even three-compartment ones to four, so that nothing new or original is incorporated in this idea. However, the determination of just where the additional diaphragm should be located to produce the best results, and what results might be expected to follow from a change of this kind, could only be determined by a series of trials or laboratory tests. Even then, the proper size and kind of media to be used are left open to question, and a consideration of open or closed circuit stage grinding further complicates the matter, until an almost infinite number of combinations might be possible, which would carry the problem into one of major research.

Editor's Note

THE VALUE of this contribution appears to be in the methods employed rather than in the results, or conclusions. The article describes a laboratory approach to a scientific solution of a common operating problem: The advantages of a three-compartment tube mill over a two-compartment mill; and where to place the compartments for grinding a particular clinker to the best advantage.

THE EDITOR.

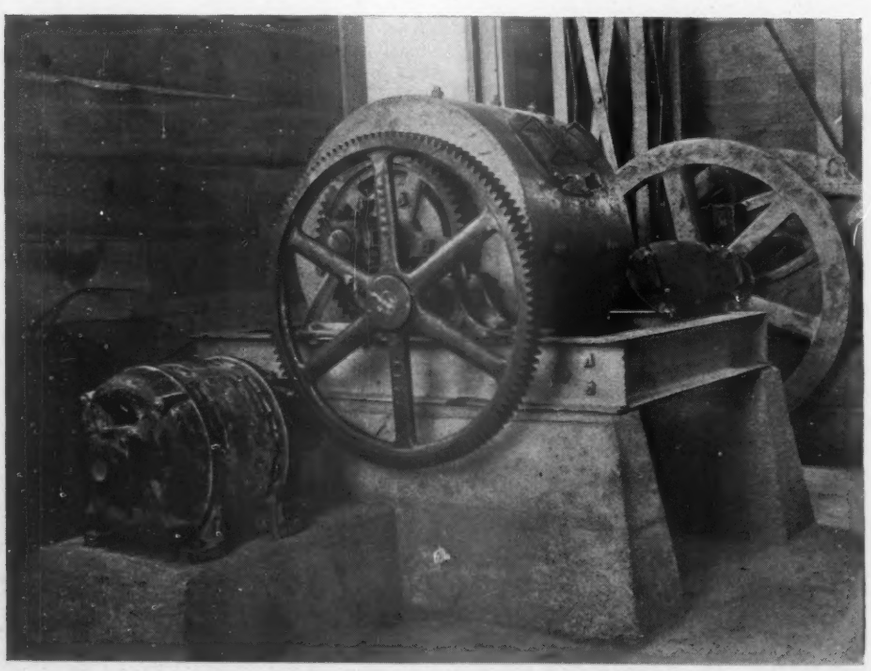


Fig. 2—Laboratory mill used to get test data

It is a tremendously large subject and, as a study of it becomes more searching, it grows in complexity. Furthermore, a consideration of power and steel consumption should be made and determined if we are to arrive at a real analysis of the subject. In regard to the former, however, it is possible to apply Rittinger's law, which states, in effect, that the energy required for producing analogous changes of configuration of geometrically similar bodies of equal technological state varies as the new surface produced by crushing or grinding; or, in other words, that the energy consumed in crushing or grinding varies with the difference between the reciprocals of the typical dimensions of the final and the original particles. This law is based on the assumption that size reduction is accomplished through shearing stresses, which must be functions of new surface exposed. Actually, much energy is used otherwise, but many experimenters report results of grinding tests which conform closely to Rittinger's law.

In this way we may make a simple deduction of expected increase or decrease of power consumption from a determination of surface area.

Consequently, and in order to simplify the matter as much as possible, the results of open-circuit, stage grinding, using 1¼-in. Concavex in the second compartment and ¾-in. Concavex in the third compartment constituted this problem.

The mill under consideration is an Allis-Chalmers Compeb mill, the first compartment of which is 8 ft. in diameter and 9 ft. long. The second, or finish compartment, is 7 ft. in diameter and 20 ft. long. This second compartment is now loaded with 1¼-in. Concavex only. The laboratory mill used in this series of tests (see Fig. 2) is 18 in. long by 24 in. in diameter; runs at 43 r.p.m., and is equipped with a revolution counter. It is

customarily loaded with 550 lb. of grinding media.

As may be noted from the accompanying diagram, Fig. 1, there are three logical places in the finish tube mill where an additional diaphragm could be located without involving too much outlay for the change. These locations are in the center of one of three respective rows of circumferential liner plates, and are designated on the diaphragm as *B*, *C* and *D*. Position *D* still leaves sufficient room for the installation of manhole openings to the new second compartment.

In order to correlate performance of laboratory mill with Compeb mill it was decided to follow a procedure as follows: With the laboratory mill loaded only with 1¼-in. Concavex, it was run for enough revolutions to produce a cement with a fineness of approximately 10% retained on the 200-mesh sieve. This number was 1200 revolutions. If we now consider diaphragm position *B* on the diagram, we find that it divides the tube into a second compartment which is 53.9% of the total length, and a third compartment which is 46.1% of the total length; 53.9% of 1200 revolutions is 647 revolutions and 46.1% is 553 revolutions. If we now assume that the total number of laboratory mill revolutions, i. e., 1200, is proportional to the total length of the tube, i. e., 20 ft., and if we should wish to divide this operation, using two different size media; in order to simulate this operation in a laboratory test, we would rotate the laboratory mill 647 revolutions, using one size of media and then rotate it 553 revolutions, using the other size media. In order to find out what effect they would have upon the resulting product, we would follow this same procedure for positions *C* and *D*, using the respective number of revolutions for each which is indicated by their respective proportionate dividing positions in the tube mill.

A quantity of clinker, sufficient to carry out this series of experiments, was set aside and crushed so that it would all pass a No. 8 sieve, which is the size of the opening between the first and second compartment of the Compeb mill. This was then thoroughly mixed. Each charge to the laboratory mill consisted of 18 lb. of clinker and 14 oz. of gypsum. For the preliminary grind, the mill was run the indicated number of revolutions, using 1¼-in. Concavex as media. It was then dumped and the balls screened from the partially ground cement. This cement was returned to the mill with a 550-lb. charge of ¾-in. Concavex and the balance of the 1200 revolutions completed, after which the ¾-in. balls were screened from the finished cement. This was repeated three times for each of the three positions, *B*, *C* and *D*. Sample "A," which designates the grind of 1200 revolutions using 1¼-in. Concavex alone, was also made up of three different grinds. This grind represents the present two-compartment mill. Each group of three was thoroughly mixed and combined into a composite before any testing of the samples was begun.

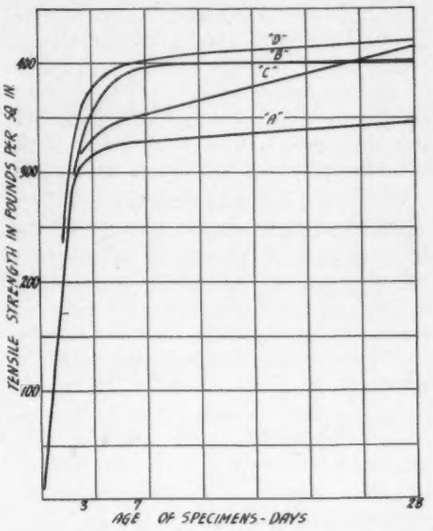


Fig. 3—Tests of sample cements plotted from Table II on succeeding page

The examination of the several cements produced was made to determine several things. Of first importance was the effect upon the productive capacity of the mill. Next in importance was the effect upon the quality of the cement as measured by its tensile strength and physical characteristics.

The calculations involved in estimating increased mill production from an increase in surface area is a simple relation. If we know that the mill is now producing 65 bbl. of cement per hour with a surface area of 1780 cm.²/g. (Sample "A"), we figure in any convenient unit of area how many of these units will be produced in one minute. If we now calculate the same production per hour, but using the increased surface per gram, we arrive at the total area per minute which would be produced if the hourly quantity production of the mill were to be held constant, but with an added diaphragm to the present second compartment. If, however, we wished to hold the area per unit of weight (cm.²/g.) constant, a direct relation obtains whereby our new estimated barrels per hour is readily calculated.

Referring now to Table I, and using Sample "A" as representing the mill as it is, we are producing:

65 bbl./hr. at 1780 cm.²/g., or 39,267 yd.²/min.

Sample "B" would produce:

65 bbl./hr. at 2170 cm.²/g., or 47,871 yd.²/min.

Sample "C" would produce:

65 bbl./hr. at 2110 cm.²/g., or 46,547 yd.²/min.

And Sample "D" would produce:

65 bbl./hr. at 2220 cm.²/g., or 48,974 yd.²/min.

Locating the diaphragm at position *B*, therefore, and maintaining the surface area at 1780 cm.²/g., we would expect a production of:

$$\frac{\text{(A) } 39{,}267 \text{ yd.}^2}{\text{(B) } 47{,}871 \text{ yd.}^2} = \frac{1.083}{x} = 1.320 \text{ bbl./min.} \times 60 = 79.2 \text{ bbl./hr.}$$

Similarly for positions *C* and *D*:

$$\frac{\text{(A) } 39{,}267 \text{ yd.}^2}{\text{(C) } 46{,}547 \text{ yd.}^2} = \frac{1.083}{x} = 1.283 \text{ bbl./min.} \times 60 = 77.0 \text{ bbl./hr.}$$

$$\frac{\text{(A) } 39{,}267 \text{ yd.}^2}{\text{(D) } 48{,}974 \text{ yd.}^2} = \frac{1.083}{x} = 1.350 \text{ bbl./min.} \times 60 = 81.0 \text{ bbl./hr.}$$

The physical characteristics of the cement have been materially changed by the changed method of grinding.

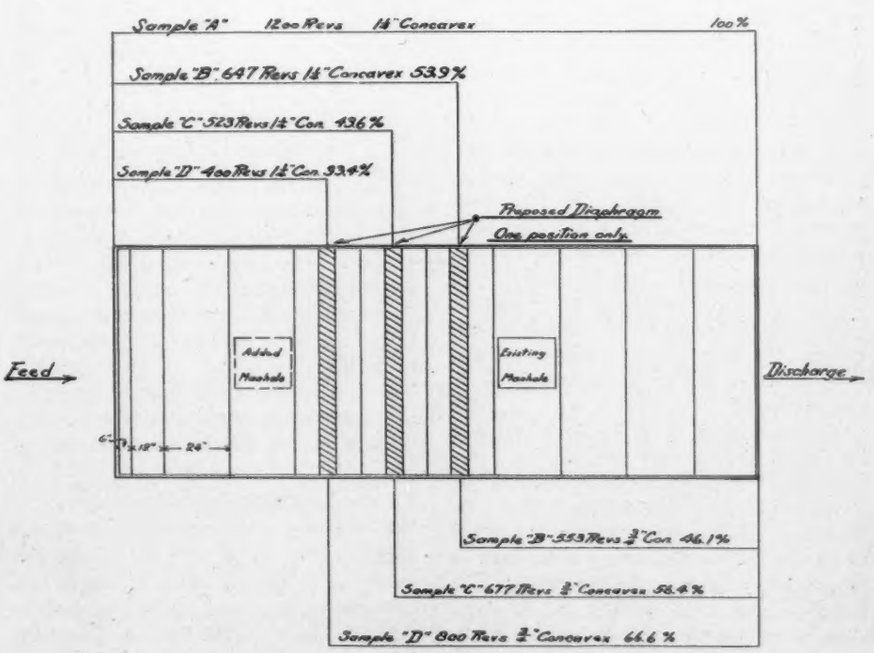


Fig. 1—Possible locations of additional diaphragm in two-compartment mill

It was quite difficult to make a determination of fineness by the standard A. S. T. M. method of hand sieving, due to the extreme fineness of the material. The tendency to ball on the screen was very pronounced and a satisfactory end point could not be reached on samples "B," "C" and "D." Sample "A" showed a residue of flaky material which refused to break up under normal hand sieving. By using the wet sieve method with a fine spray of water, satisfactory results were obtained as indicated in the second line of Table II.

Normal consistencies were about what would be expected with these finenesses and setting times were normal.

The tensile strengths of these cements were particularly interesting. As will be noted in Table II, Sample "A" failed to meet the 28-day requirement, whereas the other three samples met it satisfactorily. The figures displayed in the table do not emphasize the differences in strength as well as the chart of Fig. 3. It is quite evident that the changed grinding conditions have had considerable effect upon the development of strength. While samples "B" and "D" are of sufficient strength at 7 days and 28 days, the gain from 7 to 28 days is not sufficiently great to make a good strength cement. On the other hand, Sample "C" has a good strength at 7 days and makes a further appreciable gain to 28 days, with all indications pointing to a further satisfactory gain after that period. As one examines the size distribution of samples "B," "C" and "D," it is not at all clear why the strength of "B" and "D" should be appreciably higher at 7 days than Sample "C." Taken separately, the cumulative weights of micron sizes are close together and come well within the limit of error for checking. However, the difference in strength does exist and the only inference which can be drawn, unlikely as it may seem, is that the total areas of these three samples are in line to produce such results.

Conclusions

There remains little doubt as to the results which would be expected in a change of a two-compartment mill to one of three compartments with the conditions as stated in the opening part of this paper. Either one of two things would be accomplished or a compromise between them could be effected. Production of the mill would materially be increased, quality remaining the same; or quality could be improved, production remaining the same. It is hardly ever safe, however, to predict exact expectations from the results of laboratory tests on a relatively small scale. They are only valuable insofar as the operator governs his judgment in applying them. It should also be stated at this point that the ¾-in. Concavex used in this series of tests were new and the results obtained from them would be about as unsatisfactory as they possibly could be. A great many of them had fins or pipes and all of them were rough. Although the attempt was made to run them in the laboratory mill until they were smooth, it was soon discovered that it was hardly possible to remove more than the accumulated rust. Consequently, with the existing knowledge of the advantages to grinding of polished grinding balls we could confidently predict that, with media well worn and smooth, even better results would be realized.

Acknowledgments

The author gratefully acknowledges the kindness of L. A. Wagner for his determination of micron size analysis by means of the Wagner turbidimeter, and also wishes to express his appreciation to the Allis-Chalmers Co., who donated the ¾-in. Concavex used in these tests.

TABLE I—SIZE DISTRIBUTION AND SPECIFIC SURFACE OF EXPERIMENTAL SAMPLES
(Percent by Weight Finer Than Size Indicated)

Size—microns	Sample "A"	"B"	"C"	"D"
60	84	92.5	92	92.5
55	82	90	89.5	90
50	78.5	88	85.5	87.5
45	74	84.5	81.5	83.5
40	70	81	78.5	80
35	65.5	76.5	74.5	75
30	60.5	71	69	70
25	55	65	61.5	63.5
20	48	57	54	56.5
15	38.5	48	46	47.5
10	29	37	36.5	37.5
7.5	24	31	30.5	32.5
Specific surface, cm.²/g.	1780	2170	2110	2220

TABLE II—PHYSICAL TEST OF SAMPLES

Sample	"A"	"B"	"C"	"D"
Percent retained on 200-mesh sieve:				
Dry sieve	11.20	2.65	3.00	3.35
Wet sieve	7.95	1.45	2.05	1.80
Normal consistency	26.3	28.8	27.8	27.9
Soundness	OK	OK	OK	OK
Setting time:				
Initial	2:25	2:40	2:10	2:05
Final	4:35	4:50	4:45	4:25
Tensile strength (1:3 standard)				
1 day	176	195	189	161
3 day	306	316	314	348
7 day	328	393	350	400
28 day	345	402	415	419

Iron and Cement Made in Same Rotary Kiln

THE SIMULTANEOUS manufacture of cement and pig iron is now accomplished in a plant in Spain by the Basset process. The raw materials are said to be iron ore, coal and limestone. Obviously the necessary silica and alumina are present in the ore or in the limestone. Calcination takes place in a dry-process rotary kiln. The molten iron is discharged through a hole, and the cement clinker is delivered at the end of the kiln in the usual manner.

New Gypsum Plaster Retarder

A patented German process produces starch paste in plaster of Paris by admixing potato starch and a quantity of caustic soda to the powdered plaster before adding water to it. The potato starch forms a sticky paste with water within ten minutes, and this acts as a retardant in the setting process.

Many Ways to Achieve High Early Strength Portland Cements

THE National Bureau of Standards, in the October issue of its *Journal of Research*, publishes results of tests of samples of 28 commercial high-early-strength portland cements. This work was undertaken by the bureau to secure data on which to base a federal specification for high-early-strength cement.

The cements were found to differ widely in composition and physical properties. The tricalcium silicate contents varied from 44 to 74%, the dicalcium silicate contents from 0 to 25%, and the tricalcium aluminate contents from 7 to 15%. The specific surfaces ranged from 1990 to 2860 cm²/g.

The cements were tested for compliance with tentative specification C74-30T of the American Society for Testing Materials. Two cements contained sulphuric anhydride in excess of the limit of 2.5% of this specification. Nine cements failed to meet the 1-day tensile strength requirement of 275 lb./in.² and 10 failed to meet that of 375 lb./in.² at 3-days' age.

Four plastic mortars, using a graded Ottawa sand, were studied. Mortar A had a cement: sand ratio of 1:2.75 and a C/W ratio of 2.0 by weight. Mortar B had a cement: sand ratio of 1:2.75 and the water content was gaged to give a flow of 100 to 110% on the 10-in. flow table. Mortar C had a C/W ratio of 2.0 and the sand content was gaged to give a flow of 100 to 110%. Mortar D had a cement: sand ratio of 1:2.77 and a C/W ratio of 1.88.

The flows of mortar A ranged from 59 to 105%. The C/W ratios of mortar B ranged from 1.72 to 2.00. The cement: sand proportions of mortar C ranged from 1:2.24 to 1:2.75. The tensile strengths of mortar A ranged at 1-day age from 170 to 290 lb./in.², at 3-days' age from 265 to 410 lb./in.², at 7-days' age from 320 to 455 lb./in.², and at 28-days age from 390 to 420 lb./in.². The compressive strengths of mortar A ranged at 1-day age from 1030 to 2230 lb./in.²,at 3-days' age from 2350 to 4370 lb./in.², at 7-days' age from 3270 to 6300 lb./in.², and at 28-days' age from 4250 to 7100 lb./in.². The strengths of mortars C and B, as a rule, were, respectively, above and below those of mortar A.

The rate of setting was measured by the penetrations of 300-g. needles, one 1 mm. in diameter and one 2 mm. in diameter, into the plastic mortars contained in a Vicat ring. It is shown that this method could be used for determining "time of setting."

Six-inch prisms 1 in. square, after an initial period of 24 hours in a moist cabinet, were measured for length change under four conditions of curing.

The requirements for a specification for high-early-strength portland cement are discussed, and recommendations made for tests to be incorporated into such a specification.

Private Building Definitely on the Upgrade

Standard Statistics Company Predicts Long-Awaited Boom

BUILDING ACTIVITY is definitely embarked on a cyclical upward trend, says the November 13 Bulletin of the Standard Statistics Co., New York City. No longer is there basis for fears that the improvement is temporary, or for the belief that the progress is largely the result of artificial stimuli applied by governmental agencies.

Residential construction has followed a sharply improving trend (after allowing for the seasonal factor) since the beginning of the year, and non-residential awards in recent months have compared favorably with year-earlier totals. Improvement in the latter division may be attributed partly to privately financed projects prompted by better business conditions and partly to awards for additional structures provided for under the federal work-relief appropriation. Public works allotments finally have been stimulated by the further release of federal funds.

The pronounced gains in the residential field must be attributed entirely to private activity and can be only partially ascribed to operations of the FHA. Non-residential projects, excluding federally financed buildings, have made a rather unimpressive showing, but evidence of reviving interest on the part of private enterprise is becoming available. Public works still consist primarily of federal undertakings, but states and municipalities are demonstrating an inclination to resume independent construction. In short, all divisions of the industry are exhibiting a healthy response to normal stimuli.

Total building contract comparisons for September and for the first nine months (presented in a tabulation) are decidedly encouraging. Proof of the advance now under way is supplied by the fact that, in almost every instance, the September showing is more favorable than that for the longer period.

The continued progress indicated for coming months will partly overcome adverse seasonal influences. Mortgage applications and building permits indicate further large gains for the residential division. Higher industrial earnings and renewed confidence in the economic outlook promise increased activity in factory and public utility construction. Finally, the bulk of the funds allotted to permanent construction under the federal work-relief program is now being made available. Awards for approved projects of this type will bolster contract totals until well into 1936.

As a result of the gains anticipated in the final quarter, the full year total of contract awards is expected to exceed that for 1934, even though the nine months' aggregate was 1% below that for the like period last year. In fact, the value of allotments for the year probably will exceed $1,700,000,000, as against $1,543,101,000 for 1934.

On the whole, operating results for building material producers will be notably better than those for the preceding year. A further extension of the uptrend is probable in 1936, accompanying the expected additional rise in building activity. While the latter may progress only gradually toward the high levels of the past, percentage gains will be substantial and will be fully reflected in profits of building material manufacturers.

1935 BUILDING CONTRACTS

	*Change from Corresponding 1934 Period	
	September	1st 9 Mos.
	%	%
Commercial Buildings	+ 4	+ 4
Factories	— 1	— 20
Educational Buildings	— 66	— 19
Hospitals and Institutions	+ 98	— 13
Public Buildings	+161	+ 72
Religious and Memorial Buildings	+ 52	+ 24
Social and Recreational Buildings	+184	— 6
Apartments, etc.	+232	+ 85
Hotels	— 45	+ 43
Houses	+121	+ 88
Public Works	+ 46	— 27
Public Utilities	+ 92	— 22
Total	+ 52	— 1

*Based on dollar value of awards, as reported by F. W. Dodge Corp.

Foreclosure Sale

Escambia Sand and Gravel Corp., Pensacola, Fla., with all its real estate, machinery and equipment (dredge operation) will be sold at auction on December 2, under a foreclosure by the county court.

St. Louis Conventions

PLANS for the St. Louis, Mo., conventions of the National Crushed Stone Association, the National Sand and Gravel Association, and the National Slag Association, with a joint session of all three under the auspices of the Mineral Aggregates Institute, call for a report of those who will attend the Washington conference December 9, looking toward a resurrection of NRA.

With the prospect of a large volume of delayed public works and an increasing volume of private construction, a large number of rock products operators are expected to attend. There will be an exhibit of machinery and equipment at which much that is new is expected to be shown.

The conventions will be held in the Jefferson Hotel at St. Louis, Mo., the week of January 27.

Will Help Solve Industry's Problems

OTHO M. GRAVES, president of the General Crushed Stone Co., Easton, Penn., according to a local newspaper, has been named a member of the committee which will work with George M. Berry, federal coördinator for industrial coöperation, to devise ways and means which may be adopted either voluntarily by industry or through federal legislation to promote industrial recovery, stabilize markets, protect consumers and maintain hour and wage schedules for labor similar to those in effect in approved codes under the NRA.

As chairman of the Code Authority for the crushed stone industry and chairman of the Mineral Aggregates Institute, Mr. Graves will bring to his new task a world of experience.

"In general," Mr. Graves said, "industry is seeking to effect self-regulation and through the coördinator for industrial cooperation to submit plans to the President whereby this may be accomplished, thus avoiding the alternative of federal legislation for industry control."

To Erect New Plant

Killbuck Sand and Gravel Co., Killbuck, Ohio, announces that it has acquired a tract of gravel property of about 80 acres near Brink Haven, Knox county, Ohio, and will erect a new plant in the near future, which will be served by the Pennsylvania R. R. Production is expected to begin in the spring of 1936. C. W. and W. W. Purdy, owners, have been engaged in the production of sand and gravel at Killbuck, Holmes county, for 25 years. They will continue to operate there.

New Sales Office

United States Gypsum Co., Chicago, Ill., has opened a new district sales office at Bismarck, N .D., in charge of Gene Wright, who has been transferred from the Denver, Colo., office. His territory will include North and South Dakota, Montana and parts of Minnesota and Washington State.

Protests Rail Abandonment

Mobley Construction Co., Dardanelle, Ark., operating a sand and gravel plant, together with several other industries, have protested through the local chamber of commerce the proposed abandonment of a branch line of the Rock Island railway which serves their plants.

Buys Gravel Plant

Elmhurst-Chicago Stone Co., Elmhurst, Ill., recently purchased the plant and business of the **DuPage Sand and Gravel Co.**, near Warrenville, Ill. After improvements and repairs the plant will be operated by the new owner.

Hints and Helps for Superintendents

Metal shield protects truck hood

Rubber Hose to Patch Pipe Line

By John T. Reid
Manager, Buffalo Valley Mines Co., Lovelock, Nev.

WE WERE at great distress on one occasion to find a means of transferring water in an old "worn out pipe line" which passed across the country for two miles or more and was not buried below the surface. The pipe line had many holes in it, so, to avoid the purchase of a new line, the question was how to patch up the old one. This was answered by securing rubber hose of the same diameter as the outside of the pipe line, and then cutting off small portions of it to use as sleeves over the pipe wherever needed. These sleeves were made fast by wire bands on either side. The bands used were of a kind manufactured in Chicago.

This pipe line has served us for several years during the summer, and were it not for this arrangement, mines that could not have been financed during the period of severe strain that we have passed through could not have operated at all.

This pipe line had a pressure at different places along it of as much as 100 lb. or more.

Before the placing of the rubber hose joints over it, the pipe line, where it crossed deep depressions in the summer heat of the desert, had whipped itself about. In places, the pipe line had a movement of 5 or 6 ft.—made all the more evident by the fact that it grubbed out the sage brush. Fancy a pipe line, some two or more miles long, moving about in places in snake-like fashion with diurnal rhythm—expanding in the day time on the south sides of the hills where the sun has full play and in the depressions where the heat is magnified to as much as 115 deg., and contracting at night when the cooler air prevails! Since the rubber hose joints have been placed in use at intervals, allowing several inches here and there for expansion and contraction, there has been no further movement of the pipe line. In time, the whip movements of the line back and forth would have worn it out.

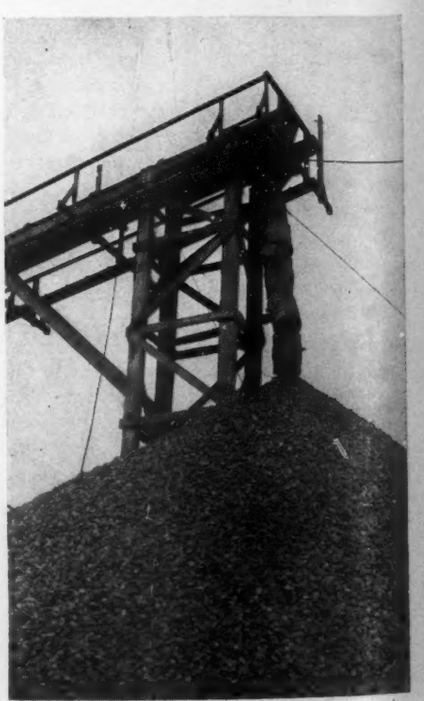
Truck Hoods

TRUCKS USED in quarry operations are subjected to severe strains and even the best designed truck bodies are bent and damaged by the constant hammering away of the falling rock. The dump body of the truck is not the only part of the truck to be abused; the hood comes in for its share. Damaging the hood itself is not a costly thing but the danger of damaging the engine is always there. To remove this latter possibility one western quarry operator had the welder mount a heavy metal shield over the hood of the engine as shown in the illustration. The shield is supported in front by crossed angle irons, and the whole is so designed that ample protection to the engine is afforded, yet the engine is open for inspection at all times. Steel plate 3/16-in. thick is used over the hood and the angle irons are 3-in. by 3-in. Note also the reinforced protecting hood over the driver's seat.

A Use for Old Dredge Pipe Couplings

A SIMPLE MEANS of preventing segregation when materials are stock piled is to have the conveyor discharge through a number of old dredge pipe couplings hung at the end of the conveyor structure as shown in the illustration. This arrangement delivers all the material to the pile evenly and prevents the coarser material from rolling down the sides of the pile, leaving the finer directly at the center, as is the case when the discharge from the conveyor is not restricted.

The couplings should be loosely hung on two chains, as shown. As the stock pile becomes larger, the bottom coupling can be removed, so that the top of the pile is always just below the lowest coupling.



Couplings aid in stock piling

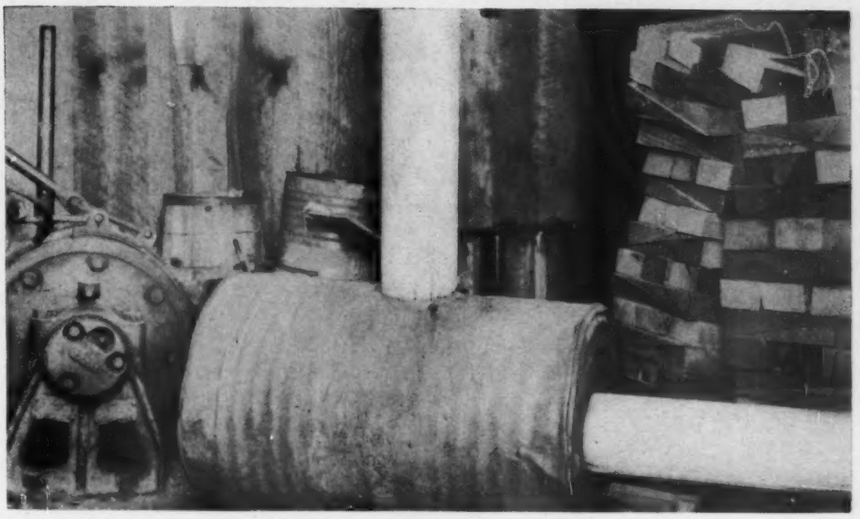
Gas Eliminator

IN BLASTING OPERATIONS in confined places such as coyote tunnels, shafts, etc., or for the removal of poisonous gases from any well or pit, a novel and simple device is in use in some western operations.

The device shown is a stove made from a carbide can. A 4-in. hole was punched in the bottom for the draft inlet pipe and a hole of the same diameter punched in the top for the stack. The inlet pipe at the end is carried to within 5 ft. or so of the bottom of the pit, or shaft, and the stack is about 20 ft. high.

When it is desired to suck powder smoke from the shaft, a fire is started in the stove and the draft thus created sucks the gases into the stove through the inlet draft suction pipe.

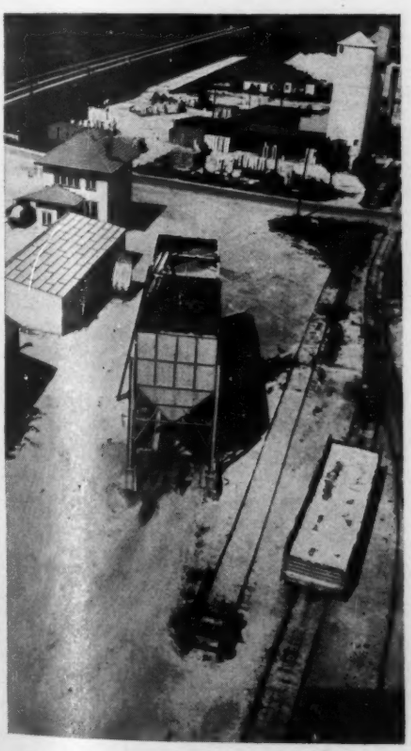
In a shaft 100 ft. deep and having an area of 6 ft. by 8 ft. it was possible to return to work within 30 min. after the fire started. These devices are quite common and work effectively up to greater depth, and if the pipe used (ordinary stove pipe) is soldered and made tight they are quite effective at the greater depths.



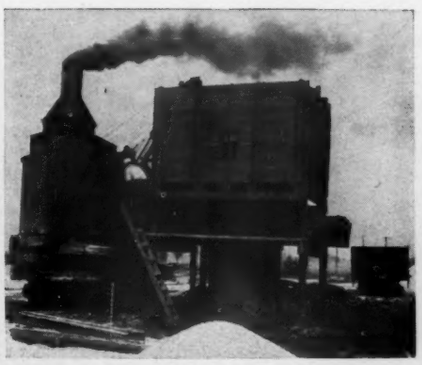
Device for removing gas from pits

Keeping Waste Material Out of Batching Bins

AT THE PLANT of the Elmhurst-Chicago Stone Co., Elmhurst, Ill., sand is handled in the batching bins although the company does not produce any itself. This sand is shipped in by rail and delivered to the bins by a locomotive crane. It was found that the bucket frequently picked up burlap and planks which had been used to stop holes in the bottom of the sand cars and deposited them in the overhead bins, causing considerable nuisance in the smooth operation of the batcher. To stop this trouble, old quarry track rails were laid across the top of the bins, spaced about 3 ft. apart. On top of these was laid reinforcing mesh, such as is used for large concrete pipe or for reinforcing in concrete pavements. This mesh catches the undesirable material and allows the sand to pass on to the bins. The company has had no difficulty after installing this screen. The screen is cleaned when necessary by climbing to the top of the bin and throwing the waste material down.



Screen keeps debris out of sand bins



Concrete pipe used for bin foundation

Foundation for Coal Bin

THE ACCOMPANYING view taken at the Consumers Co. quarry, Hillside, Ill., shows how one quarry company solved the problem of supporting a coal bin high enough above the ground to be readily available for supplying coal to its stock-piling cranes. Two old concrete pipes, obtained from an adjacent concrete products plant, were set up on end, one on top of the other, filled with earth or screenings, and the bin built on timber beams laid across the top of the pipe. By this means a much less expensive foundation was obtained than one built entirely of timber.

Saved Re-Lining Ball Mill

IN a Western plant using a grid type ball mill, the grids cracked so that some oversize particles passed through the crack and into the discharge circuit. The amount of this oversize was small but objectionable, and, as there was considerable life left in the grid and liners, making it too costly to reline, a simple screen was bolted to the discharge bell of the ball mill as shown in the illustration. The screen is 16 in. in diameter, 18 in. long, uses 4-mesh wire cloth, and is provided with a water spray to help clean the openings. The oversize that leaks through the cracked grids is returned to the ball mill feed along with the discharge from the Dorr classifier.

Oversize from mill is caught by screen

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Allentown P. C., com.[47]	11-21-35	5	6	
Allentown P. C., pfd.[47]	11-21-35	6	7	
Alpha P. C., com.	11-20-35	22	actual sale	
Amalgamated Phos. 6's, 1936[47]	11-21-35	102	103	
American Aggregates, com.[48]	11-12-35	1	2	
American Aggregates, pfd.[48]	11-12-35	4	6	
American Aggregates, 6's 1st mtg. 3/6's, 1943, new bonds[48]	11-12-35	45	....	
American Aggregates, 6's, 1943, old bonds[48]	11-12-35	45	....	
American L. and S., 1st 7's[48]	11-12-35	102	....	
Arundel Corp., com.[48]	11-20-35	22	23½	
Ashgrove L. & P. C., com.[49]	11-15-35	11¼	....	
Ashgrove L. & P. C., pfd.[49]	11-15-35	95	....	
Bessemer L. and C., Class A[47]	11-21-35	11	13	
Bessemer L. and C., 1st 6½'s, 1947[48]	11-12-35	44F	....	
Bessemer L. and C., cert. of dep., 1947[48]	11-12-35	52	55	
Boston S. and G., new, com[37]	11-12-35	1	2	
Boston S. and G., new 7%, pfd.[37]	11-12-35	6½	8	
Boston S. and G., 7's, 1939[37]	11-12-35	71	....	
Calaveras Cement, com.[40]	11-12-35	4½	5½	
Calaveras Cement, 7% pfd.[40]	11-12-35	64	....	$1.00(accum.)Nov.15*
California Art Tile, A[9]	11-13-35	11½	12¼	
California Art Tile, B[9]	11-13-35	65c	1	
Canada Cement, com.[42]	11-12-35	6¼	6¾	
Canada Cement, pfd.[42]	11-12-35	57½	58¼	
Canada Cement, 5½'s, 1947[42]	11-12-35	104½	105½	
Canada Crushed Stone, bonds[42]	11-12-35	90	92	
Certainteed Products, com.	11-20-35	7¾	8	
Certainteed Products, pfd.	11-20-35	65½	67½	
Certainteed Products, 5½'s, 1948	11-20-35	92	actual sale	
Consol. Cement, 1st 6's, 1950[47]	11-21-35	80	83	
Consol. Cement pfd.[47]	11-21-35	4½	5	
Consol. Oka. S. and G. (Can.) 6½'s[42]	11-12-35	25	....	
Consol. S. and G., pfd.[42]	11-12-35	25	....	
Consol. Rock Products, units[47]	11-21-35	2	3	
Construction Mat., com.	6-12-35	6c	actual sale†	
Construction Mat., pfd.	6-12-35	12c	actual sale‡	
Consumers Rock & Gravel, 1st mtg. 6½'s, 1948[47]	11-21-35	20	25	
Coosa P. C., 1st 6's[47]	11-21-35	18	22	
Coplay Cement Mfg., pfd.[47]	11-21-35	10	12	
Coplay Cement Mfg., 6's, 1941[47]	11-21-35	65	70	
Cumberland P. C., 7's, 1937[47]	11-21-35	75	80	
Dewey P. C., com.[47]	11-21-35	38	45	
Dolese and Shepard	11-15-35	28	31	
Dufferin Pav. and Cr. Stone. pfd.[42]	11-12-35	37	....	
Federal P. C., 6½'s, 1941[47]	11-21-35	12	20	
Fla. Port. Cement, 6½'s, 1937[40]	11-12-35	100	101	
Fla. Port. Cement, units[47]	11-21-35	23	25	
Giant P. C., com.[47]	11-21-35	½	1½	
Giant P. C., pfd.[47]	11-21-35	5	10	
Gyp. Lime & Alabastine, Ltd.	11-15-35	6⅝	actual sale	
Gyp. Lime & Alabastine, 5½'s, 1948[47]	11-15-35	92	95	
Hawkeye P. C., cap.[49]	11-15-35	30	....	
Hercules Cement, com.[49]	11-15-35	16	....	
Hermitage Cement, com.[47]	11-21-35	10	15	
Hermitage Cement, pfd.[47]	11-21-35	80	90	
Ideal Cement, 5's, 1943[47]	11-21-35	103	104	
Ideal Cement, com.[47]	11-21-35	53	55	
International Cement 5's, 1948.	11-20-35	103½	actual sale	
International Cement, com.	11-20-35	35	actual sale	
Kelley Island L. and T.	11-21-35	21⅜	actual sale	
Ky. Cons. Stone, 6½'s, 1938[47]	11-21-35	20	25	
Ky. Cons. Stone, com.[47]	11-21-35	1	2	
Ky. Cons. Stone, pfd.[47]	11-21-35	2	3	
Ky. Cons. Stone, 1st mtg. 6½'s[40]	11-12-35	15	18	
Ky. Rock Asphalt, 6½'s, 1935[47]	11-21-35	30	35	
Lawrence P. C.	11-22-35	15	16	
Lawrence P. C., 5½'s, 1942[47]	11-21-35	96	98	
Lehigh P. C., com.	11-21-35	15	actual sale	
Lehigh P. C., 7% pfd.	11-15-35	101½	actual sale .87½(accum.)Jan.2	
Louisville Cement[47]	11-21-35	90	95	
Lyman-Richey 1st 6's, 1935[47]	11-21-35	15	20	
Marbelite Corp., com. (cement pts.)[40]	11-12-35	½	½	
Marbelite Corp., pfd.[40]	11-12-35	3½	4½	
Marblehead Lime, 7's, 1944[14]	11-12-35	70	80	
Marquette Cement, com.[47]	11-21-35	26	28	
Marquette Cement, pfd.[47]	11-21-35	95	100	
Material Service Corp.[47]	11-21-35	4	6	
McCrady-Rodgers, com.[47]	11-21-35	6	8	
McCrady-Rodgers, 7% pfd.[47]	11-21-35	35	40	
Medusa P. C., com.[47]	11-21-35	15	17	
Medusa P. C., pfd.[47]	11-21-35	50	55	
Michigan L. and C., com.[47]	11-21-35	50	55	
Missouri P. C.	11-20-35	10⅛	actual sale	
Monarch Cement, com.[47]	11-21-35	75	85	

RECENT QUOTATIONS ON ROCK PRODUCTS SECURITIES

Stock	Date	Bid	Asked	Dividend
Monolith P. C., com.[9]	11-13-35	2	3	
Monolith P. C., 8% pfd.[9]	11-13-35	5¾	6¾	.25(accum.)Dec.10**
Monolith P. C., units[9]	11-13-35	13½	16½	
Monolith P. C., 1st mtg. 6's[9]	11-13-35	100	101	
Monolith Portland, Midwest, pfd.[9]	11-13-35	1¼	1½	
National Cement (Can.) 1st 7's[42]	11-12-35	102	....	
National Gypsum A., com.[47]	11-21-35	38	39	
National Gypsum, pfd.[47]	11-21-35	100	102	
National Gypsum, 6's[47]	11-21-35	104	106	
National L. and S., 6½'s, 1941[47]	11-21-35	50	60	
Nazareth Cement, com.[47]	11-21-35	4	5½	
Nazareth Cement, pfd.[47]	11-21-35	45	50	
Newaygo P. C., 7% cum. pfd.[49]	11-15-35	35	....	
Newaygo P. C., 1st 6½'s, 1938[49]	11-12-35	97	100	
New England Lime, units[14]	11-12-35	....	6	
N. Y. Trap Rock, 1st 6's, 1946.	11-15-35	74	....	
N. Y. Trap Rock, 6's, stamped, 1946	11-15-35	75	79	
N. Y. Trap Rock, 7% pfd.[40]	11-12-35	50	nominal	
North Amer. Cement, 1st 6½'s, 1953[47]	11-21-35	19	20	
North Amer. Cement, 6½'s, 1943[47]	11-21-35	77	80	
North Amer. Cement, 6½'s, 1940[47]	11-21-35	45	50	
North Amer. Cement, "A"[47]	11-21-35	1	3	
North Amer. Cement, "B"[47]	11-21-35	3	4	
North Shore Mat. 1st 6's[47]	11-21-35	35	40	
Northwestern Port. Cem. units[9]	11-13-35	43	47	
Northwestern States P. C.[47]	11-21-35	22	25	
Ohio River S. and G., com.	11-21-35	....	7	
Ohio River S. and G., 1st pfd.	11-21-35	66	....	
Ohio River S. and G., 2nd pfd.	11-21-35	....	7	
Ohio River S. and G., 6's[48]	11-12-35	9	nominal	
Oregon P. C., com.[47]	11-21-35	3	5	
Oregon P. C., pfd.[47]	11-21-35	65	70	
Pacific Coast Agg., new com.[40]	11-12-35	1⅞	2	
Pacific P. C., com.[40]	11-12-35	2¾	3½	
Pacific P. C., pfd.[40]	11-12-35	36½	38½	
Peerless Cement, com.[47]	11-21-35	½	1	
Peerless Cement, pfd.[47]	11-21-35	2	4	
Penn.-Dixie Cement, com.	11-20-35	4½	4⅝	
Penn.-Dixie Cement, pfd. A	11-20-35	25½	26½	
Penn.-Dixie Cement, 6's A, 1941	11-21-35	90¾	actual sale	
Penn. Glass Sand Corp., com.[7]	11-21-35	14	15	
Penn. Glass Sand Corp., 6's[47]	11-21-35	106	107	
Petoskey P. C., 6's, 1941[48]	11-12-35	94	....	
Petoskey P. C., 6's, 1935-38[48]	11-12-35	4	5	
Petoskey P. C., com.[48]	11-12-35	92	....	
Republic P. C., 6's, 1943[47]	11-21-35	97	100	
Riverside Portland Cement, A[9]	11-13-35	7¾	8½	
Riverside Portland Cement, B[9]	11-13-35	¾	1	
Riverside Portland Cem., pfd.[9]	11-13-35	85	89	1.50 (qu.) Nov. 1
Rockland and Rockport Lime, 1st pfd.[47]	11-21-35	3	5	
Santa Cruz P. C., com.[9]	11-13-35	30	40	
Schumacher Wallboard, pfd.[9]	11-13-35	21¾	....	
Signal Mt. P. C., units[9]	11-21-35	38	40	
Southwestern P. C., units[40]	11-12-35	190	....	
Spokane P. C., units[49]	11-15-35	7	....	
Standard Paving & Mat. (Can.), com.[42]	11-12-35	85c	1	
Standard Pav. & Mat., pfd.[42]	11-12-35	13	15	
Superior P. C., A[40]	11-12-35	43½	45	.55 (accum.) Nov. 1‡‡
Superior P. C., B[40]	11-12-35	12½	13½	
Trinity P. C., units[47]	11-21-35	20	22	
U. S. Gypsum, com.	11-20-35	83¼	84	{.50 (ex.) Dec. 24 {.25 (qu.) Jan. 2
U. S. Gypsum, pfd.	11-20-35	158	159½	1.75 (qu.) Jan. 2
Volunteer P. C., 1st 7's, 1942[49]	11-15-35	96½	....	
Volunteer P. C., units[49]	11-15-35	64	75	
Vulcanite P. C., com.[49]	11-15-35	3	5	
Vulcanite 7½'s, 1943[49]	11-15-35	60	....	
Wabash P. C.[47]	11-21-35	8	10	
Warner Co., ww. 1st 6's, 1944[47]	11-21-35	65	68	
Warner Co., com.[47]	11-21-35	2	5	
Warner Co., pfd.[47]	11-21-35	8	11	
Whitehall Cement Mfg., com.[47]	11-21-35	31	34	
Whitehall Cement Mfg., pfd.[47]	11-21-35	60	65	
Wisconsin L. & C., 1st 6's, 1940[47]	11-21-35	50	55	
Wolverine P. C., com.[47]	11-21-35	3	4	
Yosemite P. C., A. com.[40]	11-12-35	3	3½	

Quotations by: [9]A. E. White Co., San Francisco, Calif. [14] The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [37]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge, Jr., and Co., San Francisco, Calif. [42]Nesbitt, Thomson & Co., Toronto. [48]First National Bank of Chicago, Chicago, Ill. [47]Anderson Plots and Co., Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [49]Feldman & Co., Inc., Boston, Mass.

† 60 shares sold at auction, at New York, N. Y.
‡100 shares sold at auction, at New York, N. Y.
F—Flat.
‡‡This leaves $2.75 arrearage.
*This leaves $10.25 arrearage.
**This leaves $3.35 arrearage.

Recent Dividends Announced

Calaveras Cement, 7% pfd. (accum.)	$1.00	Nov. 15, 1935
United States Gypsum Co., com. (extra)	.50	Dec. 24, 1935
com. (quar.)	.25	Jan. 2, 1936
pfd. (quar.)	1.75	Jan. 2, 1936
Lehigh P. C. 7% cum. pfd.	.87½	Jan. 2, 1936
Monolith P. C. Co.	.25	Dec. 10, 1935

◆ ◆ ◆

Alpha Portland Cement Co., Easton, Penn., reports for the 12 months ended September 30, 1935, a net loss of $269,181 after taxes, depreciation, minority interest, etc., comparing with net loss of $259,776 for the 12 months ended September 30, 1934.

Current assets as of September 30, 1935, including $4,125,783 cash and marketable securities, amounted to $5,914,209, and current liabilities were $513,165. This compares with cash and marketable securities of $6,153,811, current assets of $8,297,528, and current liabilities of $226,799 on September 30 a year ago.

Consolidated income account for 12 months ended September 30, 1935, compares as follows:

	1935	1934
Net sales	$4,840,051	$4,583,014
Operating expenses	3,813,497	3,562,458
Depreciation and depletion	1,450,968	1,431,476
Operating loss	$424,414	$410,920
Other income	*203,849	201,394
Loss	$220,565	$209,526
Income charges	51,533	62,214
Loss	$272,098	$271,740
Minority interest (credit)	2,917	11,964
Net loss	$269,181	$259,776
Preferred dividends	58,334	140,000
Common dividends	644,600	.....
Deficit	$972,115	$399,776

*Includes $23,521 net profit on sale of securities, and $35,743 adjustment of marketable securities to lower of cost or market at close of 1934.

Total assets and liabilities were reduced from $26,014,092 on September 30, 1934, to $21,647,485 on September 30, 1935.

◆ ◆ ◆

United States Gypsum Co., Chicago, Ill., has declared an extra dividend of 50c a share on the common stock and set a precedent with issuance of a nine-month earnings report.

The extra dividend will be payable December 24 to stock of record December 6, while the regular quarterly dividends of 25c and $1.75 also declared on the common and preferred stocks respectively will be paid January 2 to holders of record December 6.

Nine months ended September 30 net income was reported at $2,888,935, equal after preferred dividend requirements to $2.08 a share on the 1,191,412 shares of common stock compared with $1,777,574 or $1.15 a common share in the corresponding period last year.

Indicated net income for the three months ended September 30 was $1,261,458, equal to slightly less than $1 a common share, compared with an indicated net income of $635,906 or 41c a share in the third quarter of 1934.

This report marked the first time the company has released third quarter earnings figures, the management having heretofore maintained that since the business is subject to very wide seasonal swings, earnings figures for the interim periods might be misleading.

The extra dividend of 50c on the common will bring the total dividends on that issue declared or disbursed for the current year to $1.75. On October 1 last the company paid an extra dividend of 25c a share in addition to the regular 25c quarterly payment.

◆ ◆ ◆

Ideal Cement Co., Denver, Colo., has notified all debenture bond holders that it will buy at 102 and interest to January 1, 1936, all bonds offered. There are $1,386,000 outstanding, paying 5%. The company, it is said, has a large accumulation of cash on hand and wants to use this to reduce interest charges.

◆ ◆ ◆

Newaygo Portland Cement Co., controlled by Medusa Portland Cement Co., Cleveland, Ohio, called its entire issue of first mortgage collateral 6½% bonds, due June 1, 1938, at 101½ on December 1, 1935. About $792,000 was outstanding in January, 1935.

◆ ◆ ◆

Pennsylvania-Dixie Cement Corp., New York City, reports for the 12 months ended September 30, 1935, a profit of $1,083,930 before depreciation, depletion and interest, comparing with profit of $978,425 for the 12 months ended September 30, 1934. After provision for depreciation, depletion and interest there was a net loss of $830,242, against net loss of $950,900 in preceding 12 months.

Current assets as of September 30, last, amounted to $4,179,833 and current liabilities were $245,557, against $4,821,348 and $333,195 respectively on September 30, 1934.

Consolidated income account for 12 months ended September 30, 1935, compares as follows:

	1935	1934
Operating profit	$1,083,930	$ 978,425
Depreciation and depletion	1,369,795	1,360,848
Loss	$285,865	$382,423
Interest	544,377	568,477
Net loss	$830,242	$950,900

◆ ◆ ◆

Arundel Corp., Baltimore, Md., sand and gravel producer, and contractor, reports net profits for the nine months of 1935 as follows:

9 months to September 30:	1935	1934
3 months to March 31	$178,658	$148,360
3 months to June 30	201,163	163,272
3 months to Sept. 30	220,956	261,542
9 months	$600,777	$573,174

Quarterly earnings, per share (in dollars):

	1935	1934
1st quarter	0.36	0.30
2d quarter	0.41	0.33
6 months	0.77	0.63
3d quarter	0.45	0.53
9 months	1.22	1.16
4th quarter	....	0.32
12 months	....	1.48

Based on 492,556 shares.

Working capital September 30:

	1935	1934
Current assets	$2,944,139	$2,928,969
Current liabilities	400,577	730,165
Working capital	2,543,562	2,198,804

International Cement Corp., New York City, and subsidiaries, reports for the quarter ended September 30 a net profit of $299,707 after depreciation, interest, reserve for income taxes and contingencies, etc., equivalent to 48c a share on 626,278 no-par shares of capital stock, excluding 10,700 shares held in treasury.

This compares with $339,418 or 54c a share in preceding quarter and $185,591 or 29c a share in September quarter of previous year.

For nine months ended September 30, last, net profit was $754,728 after charges and taxes, equal to $1.20 a share, comparing with $532,564 or 85c a share in first nine months of 1934.

Income account for quarter ended September 30, 1935, compares as follows:

	1935	1934
Net sales	$3,922,619	$3,672,583
Costs, expenses and depreciation	3,275,571	3,104,332
Profit	$647,048	$568,251
Interest, amortization, etc.	219,762	197,582
Federal taxes and contingent reserves	127,579	185,078
Net profit	$299,707	$185,591

Nine months ended September 30:

	1935	1934
Net sales	$10,572,347	$10,314,028
Costs, expenses and depreciation	8,759,046	8,653,584
Profit	$1,813,301	$1,660,444
Interest, etc.	661,379	640,731
Federal taxes and contingent reserves	397,194	487,149
Net profit	$754,728	$532,564

◆ ◆ ◆

North American Cement Corp., Albany, N. Y., reports for 12 months ended September 30, 1935, net loss of $438,112 after taxes, depreciation, depletion, interest and amortization, comparing with net loss of $129,569 for the 12 months ended September 30, 1934.

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National Gypsum Co., Buffalo, N. Y., for the first nine months this year had net income of $438,756 after taxes, interest and depreciation, equal, after provision for preferred dividends to $2.25 a share on 130,463 shares of Class A stock outstanding. This compared with $263,478 or 99c a share in corresponding period last year. These figure do not take into consideration any earnings from Universal Gypsum & Lime Co., now operating as a subsidiary of National, nor does the per share computation reflect the increase in number of Class A shares incident to acquisition of Universal because that merger is not yet completed.

On the basis of these figures for the nine months and estimates for the remainder of the year, indications are that the company's 1935 net income may total $600,000, or something over $3 a share on the indicated number of Class A shares. In 1934 National netted $321,541, equal after preferred dividends to $1.10 a Class A share.

Two New Silica Plants

Pick Up in Steel and Foundry Demands Leads to Development of New Deposits of St. Peter Sandstone in Arkansas and in Iowa

THE EVERTON SILICA SAND CO., Everton, Ark., which has had a new sand plant under construction since early in the spring, put the plant in operation on September 20. C. C. Garner, who superintended the construction of the plant is the general manager of the concern. Raw material comes from a 25-ft. face of white St. Peter sandstone, with a proven reserve lying under 30 acres. The sandstone is the top formation of a hill, and is free from stain and other foreign substances The average of numerous analyses shows 99.70% silica.

Three grades of sand are made: glass sand, steel molding sand, and fine sand for fertilizer filler, etc.

From the quarry to shipment of finished product gravity plays a big part in the movement of the material. The quarry is located about 600 ft. from the dryer and storage bins, and is approximately 100 ft. higher.

Drilling is done with two Ingersoll-Rand jack hammers, driven by two single-stage Sullivan air compressors, of 115 c.f.m. of free air a minute. Horizontal holes 12 ft. deep are drilled in the face of the ledges, and fired with dynamite.

Crushing, Screening, Drying

The broken sandstone is moved to the crusher bin by trucks equipped with automatic dumps. This bin has a capacity of 400 tons and the material passes from it by gravity to a 16-in. Cartersville jaw crusher, which does the primary breaking.

From the crusher the material moves by gravity into a 28-mesh, 12-ft. rotary trommel screen, the oversize going by gravity to a set of 36-in. smooth-faced rolls, then back to the screen by a bucket elevator.

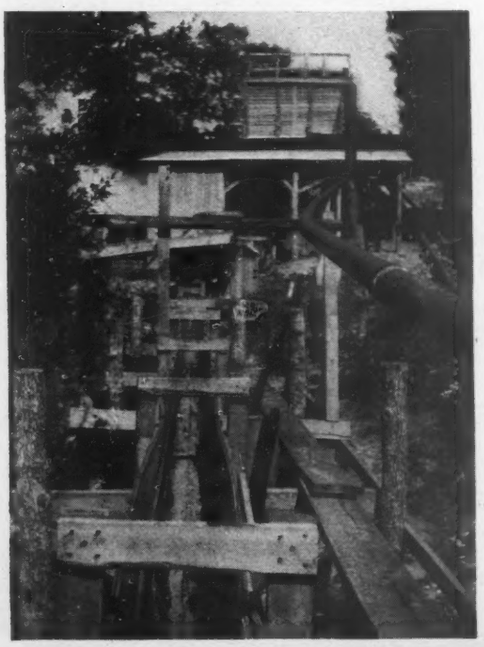
The screened sand passes by gravity into a 12-cell eccentric scrubber, of the silica company's own design, each cell of which is equipped with an eccentric paddle, which scrubs and cleans it, removing all stain and foreign substance. The gravity flow continues from the scrubbing unit to a settling tank, where the product is dewatered.

It is then driven off the settling tank with clear water into a flume 575 ft. long and 1 ft. square to three draining bins, which have a capacity of 1000 tons. These bins are 14 ft. wide and 70 ft. long, with a 12-in., 20-ft. c. to c. conveyor running across the upper ends. After the product has drained as much as possible under natural conditions, it is dragged into the screw conveyor, with a drag pulled with a steam hoist, and the conveyor feeds it slowly into a bucket conveyor, which carries it to 6x32-ft. rotary dryer which removes all of the surplus moisture. The dryer is fired with crude oil.

After drying it is classified and is elevated to the three shipping bins, with a capacity of 1050 tons. From these bins it is loaded into the cars by gravity.

Because an abundance of pure water is a very important factor in the production of commercial sand, the company is fortunate in finding a location on Clear Creek, a clear-water mountain stream which affords a plentiful supply of water even during the driest summer months.

The pumping unit which furnishes all water consumed in the operations consists of an 8-in. Gould centrifugal pump, driven by a 40-hp. steam engine. The water lines



Left—Crushing and washing units of Everton Silica Sand Co. Right—Drying, storage and shipping units. Below, left—Pump house for wash water. Right—Part of deposit opened for quarrying

Above, left—Cone classifiers and one storage tank. Right—Vibrator screen and two vacuum sand pumps. Left—Rotary screen. Right—Pump for wash water. Below—Pit excavation

of the St. Peter formation. The Langworthy company owns a stratum 100 ft. high and about ¼ to ½ mile long. Above the sandstone is an overburden consisting of a mixture of clay and Galena limestone which varies from 2 to 40 ft. deep. This is stripped off by means of a Sauerman 1½-yd. power drag scraper operated by an 8¼x10 double-drum Stroudberg hoist, together with a Bucyrus-Erie Type B shovel. After the stripping operation is done, the entire stope

that carry water to the washing unit consist of two 6-in. pipe lines which carry approximately 1200 g.p.m.

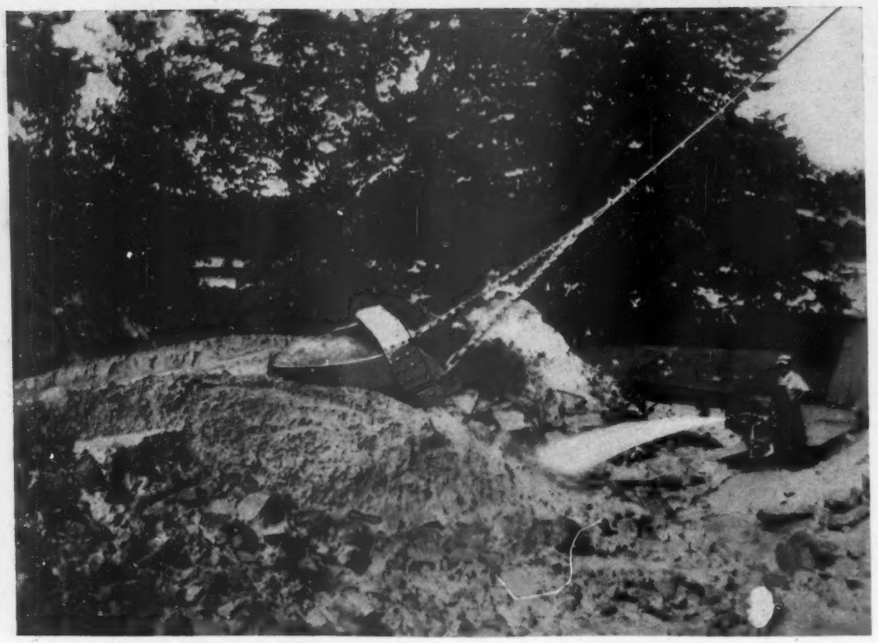
Steam is furnished to the different units by a 165-hp. boiler which is located in the drying unit at the foot of the hill. A 15-hp. auxiliary boiler is located in the washing unit 575 ft. from the main boiler and is tied into the steam line at that place. Mr. Garner states that this boiler takes care of steam lost by condensation.

The plant is located about one-quarter of a mile from the depot at Everton, on the Missouri and Arkansas Railroad. A new side track has lately been completed from the main line to the plant and shipments will be made over this road.

New Iowa Plant

AN INTERESTING PLANT for the production of silica sand is operated near Dubuque, Iowa, by the Langworthy Silica Co., which has its offices in the Federal Bank building in that city. The Langworthy plant is 1¼ miles east of the town of Clayton, in Clayton county, Iowa, on the Chicago, Milwaukee and St. Paul railroad and the Mississippi river.

The deposit is a consolidated sandstone



Scraper bucket discharging load in front of nozzle

is washed off with water to make sure that all of the surface is clean and free from clayish materials.

The drilling is done with an Ingersoll-Rand jack hammer. The holes are drilled to a depth of 14 ft. and the shots vary in size according to conditions. Some shots have 30 holes and others have 6 to 10. The blasts are set off with an electric battery. About three-fourths of the blast shoots to sand, and lumps too large to wash are broken by hand with a poll pick.

After shooting, the sand is picked up by the Bucyrus-Erie shovel, previously mentioned, and dropped in a runway, from which point the sand is dragged to the washing plant by the same Sauerman Crescent drag scraper that assisted in the stripping. The scraper runway ends at the brow of a hill just above the screen and storage tank. Facing the point where the scraper dumps its load is a 1½-in. Universal nozzle, operated by one man, delivering water under a pressure of 115 lb. per sq. in. Water from this nozzle washes the sand into a rotary screen. The average length of haul of the Sauerman scraper is about 300 ft., and the scraper is delivering 60 to 70 tons per hour to the nozzle.

No Crushing Required

The rotary screen acts as a tube mill where all oversized lumps are worn down to the size of the ⅝-in. perforations and pass through. From this screen the product is discharged on to a Diester vibrator which vibrates at the rate of 1200 revolutions per minute. The size of the opening of the screen on this vibrator is 1/16 in. Everything over that size is taken out and eliminated.

After passing the Diester vibrator screen the sand is discharged to a sump where it is picked up by two Nye No. 4 vacuum pumps. These pumps deliver the sand to three Allen cone classifiers set above the storage tank. Additional water is added at this point to improve the washing process so that these classifiers are handling 1000 g.p.m. of water, together with the sand.

The classifiers discharge the finished product into large steel storage tanks where the sand is allowed to stand to permit the water to drain off. From the tanks it is loaded into cars with a 1½-yd. Blaw-Knox clamshell bucket operated by an American Derrick hoist.

Foundries are the chief customers of the Langworthy Silica Co. The sand is used also by contractors to give a white finish on plaster walls and by marble cutters and polishers. It is suitable also for glass making purposes and as a filter sand.

The company officers are: Otto F. Lange, president; E. R. Young, vice-president; John G. Chalmers, treasurer; Harvey M. Lange, secretary.

W. T. Hardison & Co.'s new sand washing and classifying unit

Makes Better Product

Central Rock Co., Lexington, Ky., has recently made numerous improvements. An 18-in. belt conveyor (Columbus with Goodyear belting), 40-ft. centers, has been installed. It runs along and below the five bins. A 24-in. chute and gate have been added to each bin. Material to be washed is let out of its bin (or bins, if a mixture is desired) and the belt carries it to a ¼-in. mesh single-deck Telsmith vibrating screen. Here six Binks nozzles are placed and water is sprayed on the material. It discharges directly into a 5-yd. loading bin, where trucks haul it away. A sand plant was recently added. Minus ⅛-in. discharges to a 14-in. Columbus conveyor and Goodyear belt and goes to a Columbus sand drag, 15-ft. centers. It then passes through another similar one, and the sand is stored. The waste water goes by pipe underground to a settling pool where additional fines are recovered. A Telsmith No. 40 gyratory crusher was recently replaced by a 36-in. Telsmith "Gyrosphere," which gives 30% more "chip" size stone. By chip size is meant 100% passing ¾-in.; 30-70% passing ½-in.; 100% retained on ⅛-in. with 5% tolerance. The average from the scalping screens and the returns from the sizing screens go to this gyrosphere.

Accurate Sand Grading

W. T. Hardison & Co., Nashville, Tenn., have recently added new washing and classifying equipment to their river sand and gravel plant. A new steel superstructure was erected adjacent to the plant proper. The sand which is to be rewashed and classified into two sizes or grades is brought from the plant on a belt conveyor and discharged to a double-deck, 3x4-ft., Niagara vibrating screen. Water is sprayed over the material on the screen by means of two 2-in. pipes leading from a 4-in. water main. Clean water is supplied by a 4-in. Fairbanks-Morse pump driven by a 5-hp. electric motor. The two screen dischargers go to two twin-screw Perfect classifiers (15-in. diameter blades), which discharge to two ground storage compartments or bins of 350 tons capacity each. A locomotive crane moves the sand to stock piles when necessary, or loads directly into cars for shipment. The capacity of the new washing and classifying equipment for greatest efficiency is tons per hour.

FHA Loans Can Be Made to Help Rock Products Industry*

IN STIMULATING BUILDING, modernization and repair the Federal Housing Administration, which is carrying out the provisions of the National Housing Act, has been and will continue to be of great help to the producers of rock products.

Of course the volume can not be expected to compare with the quantities used in the great engineering projects—road building and projects of that kind—but none the less, the Housing Administration is expanding the field for the use of these materials.

Even large producers, with vast capital and credit, may be interested in modernization credit insured under the provisions of this Act with a maximum of $50,000 for each property. This may be spent for improvements or alterations to the structure and the purchase of certain types of non-portable equipment and machinery essential to the conduct of their own business.

But since the success of the producer depends in the end on sales, he would naturally be interested in thousands of these comparatively small projects in which rock products have been used, or may be used.

So it would not be amiss for even the largest producer to familiarize himself with this legislation, so that the word may be passed down along the line until it reaches the contractor or salesman. He in turn, if he is wide awake, will contact the person or company preparing to build, to modernize or to repair. The final total will amount to a great volume of business.

As it is, the statistics available indicate that these smaller building projects have taken up quite a bit of the slack due to the delay in starting the great road projects and some of the other major engineering jobs.

To explain the legislation:

It provides first for modernization and repair of existing structures, the purchase and installation of machinery and equipment. This is done with credit advanced by banks and other lending agencies under an insurance arrangement with the Federal Housing Administration. The government does not lend the money, but the Federal Housing Administration insures these agencies against loss on such loans up to 20% of the total.

Such loans range from the modest one of a hundred dollars or so for work on the small home to the $50,000 maximum for business properties, such as hotels, hospitals, apartment houses, manufacturing plants, department stores.

The terms are easy and attractive. The carrying charge may be as low as the lending agency agrees, but may not be in excess of the equivalent of a $5 discount for each $100 face value of a one-year monthly installment note. The money is to be repaid in equal monthly installments and may be spread over a period of as long as five years.

Experience since this plan was put in operation—August of 1934—has shown that the bankers are no longer hesitant in making the advances and that the man in need of such assistance does not mind assuming the obligation on these terms when increased income will result.

There are instances, of course, in which the manufacturer or dealer in equipment or machinery used in producing rock products, or preparing them for use, would find a market for equipment which would come within the $50,000 limit. The increasing number of ready-mixed concrete dealers comes in this class.

There are cases too numerous to list here in which the Federal Housing Administration has either directly or indirectly helped the various rock products industries.

Take the case of a bakery (many in fact) which wished to modernize and bring the establishment up to date, milk pasteurization plants, warehouses of various kinds, in which concrete and cement had to be used. Loans have been insured by the Housing Administration to enable them to do the work.

Garages, large and small, all kinds of service stations, the corner grocer, restaurants, all are obtaining the benefits of this legislation and many are using rock products.

But there is still a large field left undeveloped and the contractor can enter this field if he employs alert solicitors, or uses his practiced eyes. Ordinarily he can tell at a glance where these durable building materials may be used to advantage, to restore the structure, improve it and in most instances protect the investment if not actually enhance the value.

With the aid offered rural modernization by the Federal Housing Administration, farmers are using concrete and cement extensively. Old broken down wooden barns —fire hazards and insanitary, to say the least —are being replaced with concrete structures. Service buildings of all kinds are either being built because a need is being discovered for them, or are being rebuilt with concrete.

The old farm house is being modernized with concrete foundations, a basement to take care of modern heating, concrete driveways and a variety of other improvements.

Dairymen in particular have become large users of rock products. This followed the decision of sanitary and health officers throughout the country to enforce regulations governing conditions under which milk could be produced for the market.

This called for the immediate use of concrete to replace rotted wood and eliminate generally unhealthful conditions. Dairymen had to act promptly or suffer the probable penalty of having their milk barred from the markets.

Contractors who have looked over jobs on the farm and the home have found it profiable to suggest such innovations as ponds, and reservoirs, both eligible for modernization loans and have had little difficulty in making the sale. The farmer of today is easily convinced on the subject of these necessities.

Take into consideration the fact that as of November 6 the total for modernization credit under the Housing Administration plan was well above the $200,000,000 mark. Estimates submitted by state directors as to the amount of work of this nature financed by private funds indicate that at least $1,000,000,000 has been thus expended.

Naturally the rock products industry should be getting its fair share of this as it does in all building operations.

*Written especially for ROCK PRODUCTS by the staff of the FHA.

Contractors' Meet to Feature Private Construction

Associated General Contractors of America will hold their annual convention in Miami, Fla., January 13, 14 and 15. For the first time in more than four years it is anticipated that the convention's major attention will be turned to the encouragement and acceleration of this pronounced trend in private construction, rather than to the field of publicly financed work, upon which the industry has had to rely so heavily during the depression. Managing Director Harding estimates that there is an accumulated deficit of at least eighteen billion dollars in private construction over the period of the last five years, and that the recent upward trend may be viewed as a seepage through that must soon break the dam which has pent up this demand. He attaches particular significance to the fact that industrial construction is setting the pace in this movement, and believes that when the dam is broken the wheels of all industry will again start turning at a sustained rapid pace.

Expands Operation

Michigan Silica Co., Rockwood, Mich., plans a new silica sand refining plant at mining properties at Flat Rock, Mich., including several one-story units for crushing, grinding, screening and drying, with power house, storage, loading and distributing departments, to cost about $100,000 with machinery and mechanical handling equipment. Smith, Hinchman & Grylls, Marquette Building, Detroit, are architects and engineers.

What's New in Safety Trophy Dedications?

How Various Cement Companies Have Utilized the Event

WINNING a Portland Cement Association safety trophy has become an annual event with some plants in the industry; others each year experience it for the first time; not a few have still to make the grade. The dedication or re-dedication of these trophies is made a memorable event; naturally there is a good deal of sameness to the programs, but this year considerable ingenuity was used at various plants to make them more interesting and more useful.

Running through the dedications that have been held this year to date, we note the following:

Universal Atlas Cement Co., Buffington, Ind. (reported in ROCK PRODUCTS, July), had the Governor of the State of Indiana as guest and principal speaker, lending special dignity to the occasion; and, together with many gentlemen of the press as specially invited guests, this resulted in very widespread and favorable publicity.

Marquette Cement Manufacturing Co., Oglesby, Ill., confined its dedication ceremonies to 600 employes and their families; speakers were company executives, from the chairman of the board down, and the opportunity was afforded for each group to understand the other the better.

Small, select group picnics at Jamesville, N. Y.—Alpha

Canada Cement Co., Montreal East, Que., had many public officials, industrialists and local citizens as guests, a group of whom were afterwards entertained at the Montreal Engineers' Club, helping thus to establish closer public and business relations.

Prize-winning largest family of an employe—Kosmos

Louisville Cement Co., Speeds, Ind., followed the usual program but added games and contests in the community park house, adjacent to the plant, in which almost everyone present participated. Among the unique events for which valuable prizes were awarded were a husband-calling contest, a contest between families with a prize for the one having the greatest number of members on the company payroll, balloon bursting, cone eating and horseshoe pitching contests, awards for largest family present and the family representing the greatest number of years of service with the company, and a baby contest. There was also a full program of sports events. After a buffet supper served in the community house the prizes were awarded and the very enjoyable day was concluded with an evening band concert.

Kosmos Portland Cement Co., Kosmosdale, Ky., boasts that 99.44% of its organization is of Kentucky origin. Distinguished guests at its trophy dedication were Mayor Neville Miller of Louisville, and F. W. Rodenheher, director of the Louisville Safety Council, who used the occasion to drive home the need of prevention of traffic and home accidents.

Alpha Portland Cement Co., Jamesville, N. Y., confined its dedication ceremony to about 60—the employes, officials, a few guests, including aged former employes. These grouped themselves about the trophy in an intimate get-together meeting. A picnic followed this meeting.

Missouri Portland Cement Co., Sugar Creek, Mo., had as a special guest and speaker U. S. Senator Harry S. Truman; and other notables were guests. After a

Outdoor sports at Independence, Mo.—Missouri

buffet luncheon there were field events and inspection trips through the plant.

* * *

Evidently there is much opportunity for originality in making the most of these dedications. There can be other ways of cultivating good will and good publicity than speeches and music, although of course these have a proper place.

Increases Storage

Consolidated Cement Corp., Fredonia, Kan., is constructing six new reinforced concrete soils which will increase its storage capacity for finished cement by 60%.

New Sales Office

Calaveras Cement Co., San Andreas, Calif., has established a Seattle, Wash., sales office in the Walker building, in charge of F. T. Crowe, whose territory includes Washington, Oregon and British Columbia.

Canadian Tariff Changes

THE NEW trade treaty signed by the United States and Canada, to become effective January 1, 1936, reduces the duty on Canadian limestone (other than building and monumental) from 5c per 100 lb. to 2½c per 100 lb. (50c per ton); lime, not specially provided for from 10c to 7c per 100 lb. ($1.40 per ton); hydrated lime from 12c to 8c per 100 lb. ($1.60 per ton); feldspar, crude, from 50c to 35c per long ton; talc (valued at not over $12.50 per long ton) from 35% to 25% ad valorem. Most of the reductions are on food products.

The Canadian Government in return made many concessions in favor of manufactured products, including machinery used in the rock products industry, reductions in this case ranging from 8 to 50% ad valorem.

Asphalt Competition?

CHARGES of price conspiracy against eight cement companies, filed in "a taxpayer's" suit with the district court at Oklahoma City, Okla., on November 4, resulted in the issue of a temporary restraining order preventing the state highway commission from awarding contracts for three federal aid highway jobs. (The restraining order was dissolved in a few days' time.)

The petition, filed against the highway commissioners, alleges that "prior to January 1, 1931, each (the cement companies) entered into unlawful conspiracy and combination, the purpose of which was to arbitrarily fix and determine a price for cement," and "conspired to eliminate competition."

The petition then alleges that "on January 1, 1933, all advanced the price of cement from $2.04 to $2.40 a barrel," and "on January 1, 1934, advanced the price to $2.75 a barrel."

The petition claims an agreement was made "whereby the amount of cement sold in the state for highway construction is equitably divided among producers according to capacity, to control the price."

Banned in New York

Imported cement will be banned from use on PWA and WPA jobs in New York City, according to City Comptroller Taylor. He proposes to increase the present 20% differential to 50%. Since October 11 contractors on city work could use imported building materials if they were 20% less in price than American.

Porto Rican Cement Plant

Pan-American Cement Corp., Porto Rico, is to build a new plant, according to reliable reports. Fred B. Franks, of the National Portland Cement Co., Brodhead, Penn., is the promoter.

Accused of Price-Fixing

A BROADENED COMPLAINT, including charges against additional concerns, has been issued by the Federal Trade Commission against the Building Material Dealers' Alliance of Pittsburgh and Cleveland. It charges formation of a combination to compel distribution of building materials through "recognized" dealers affiliated with the organization and fixing prices by agreement.

The Lime and Cement Exchange of Baltimore, the Maryland Builders' Supply Association and the National Federation of Builders' Supply Associations of Pittsburgh are included in the revised complaint.

Other respondents named in the original and supplemental complaints are Pittsburgh Builders' Supply Club of Pittsburgh, Western Pennsylvania Builder Supply Alliance of Pittsburgh, Building Material Institute of Cleveland and Allied Construction Industries of Cleveland.

A number of officers, agents or employes of the associations and organizations listed also are named as respondents.

Knocks Government Loan for Cement Plant

B. C. Forbes, business writer for the Hearst newspapers, has taken up the cause of the cement industry in the *New York American* of November 12, by stating the facts in regard to the recent R.F.C. loan to complete a promoter's cement plant in Arkansas. The editor of the *Chicago Journal of Commerce* recently commented in a similar manner on the same loan.

Name Changed

Walker County Stone Co., Huntsville, Tex., has been incorporated for $30,000. The business was formerly known as the Huntsville Stone Co.

New British Plant

Ribbesdale Cement, Ltd., Clitheroe, has been organized on a 50-50 basis by the Ketton Portland Cement Co., Ltd., and the Tunnel Portland Cement Co., Ltd., of Great Britain. New works are now in course of erection and are being equipped with a cement plant for a capacity of 85,000 tons per annum, with every modern improvement, and production is expected to commence in May next.

Office Destroyed

Yosemite Portland Cement Co., Merced, Calif., suffered destruction of its office and storage building by fire on November 1, with a loss estimated at $60,000. About 2000 bbl. of cement and 160,000 empty sacks were destroyed by fire and water. Office equipment was lost but records in a vault were saved. The building was steel frame—not concrete.

Lime Producers' Forum

Conducted by Victor J. Azbe,
Consulting Engineer, St. Louis, Mo.

The Burning of Spalls in Mixed Feed and Natural Gas Fired Kilns—Part 2

IN THE FIRST PART of the article (published in the November issue) were demonstrated the great advantages that prevail when burning small stone—the much greater surface, the far higher heat transfer and so tremendous capacities in comparatively small kilns.

Large pieces of rock as burned in ordinary vertical kilns pass through the kiln in about two days; in some very exceptional kilns they pass through in a day; in some also exceptional, but that in a negative manner, a week transpires between the time rock is charged on top and the same lump comes out of the cooler as lime.

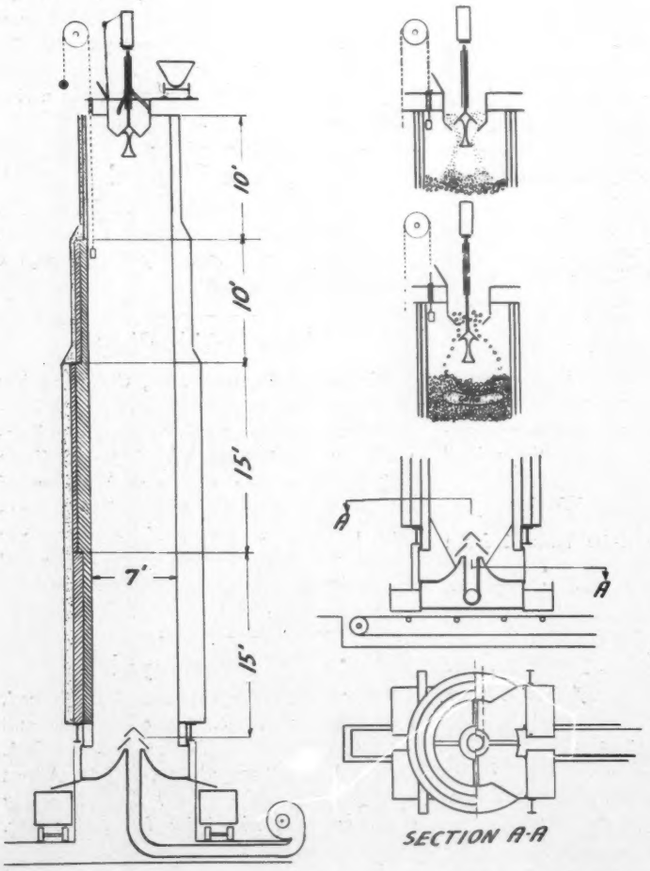
In contrast, limestone passes through the rotary kiln in just about four hours' time, and burning conditions in a rotary are not at all favorable. There is little gas percolation in the stone charge, the gas passes through the wide open space above, and the velocity of this gas is highest along the uppermost part of the kiln farthest from the rock and lime. There is some heating from the hot lining below, but through the charge itself there is little gas travel; in fact, it is not natural for gas to take this path when it has an open space to pass through, virtually without resistance. In view of this, heating in the rotary kiln is almost entirely by radiation; but in spite of this, the rock is converted to lime in only four hours. How much more favorable would the conditions be calcining equal sized rock in vertical kilns, with the hot gas in immediate contact with the product, the gas passing by at high velocity, scrubbing off the dead film of spent cooled gas continuously; the gas forced to take this path with none other available.

Rotary kilns are, from a fuel standpoint, notoriously inefficient, and naturally so, as it is difficult to extract heat from a hot gas by a far removed extracting medium. Efficiencies on the order of only 30% are secured; the waste gas temperature, even when the kilns are exceedingly long, are more than 1000 deg. F. and all for the lack of intimate contact.

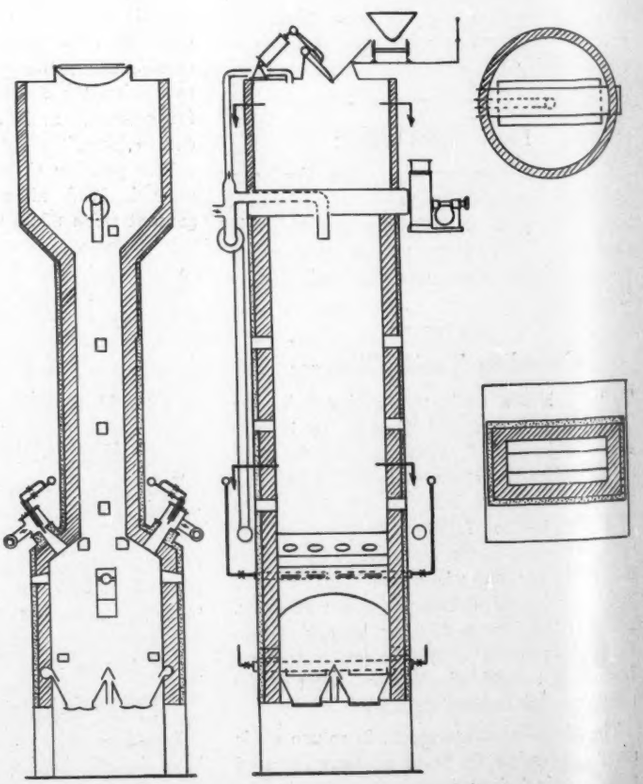
In vertical kilns this contact will be secured to the utmost degree. Trials prove that the waste gas temperatures will be very low and kiln efficiencies very high. An efficiency of 60 to 70% is assured, and when everything is right, even higher may be expected. A 70% efficiency with natural gas of 995 B.t.u. per cu. ft. means the unheard-of low figure of 2660 cu. ft. of gas per ton of lime. With such an efficiency it makes but little difference whether the gas costs 20 or 30 cents a thousand, as all the other gains, such as low kiln cast, and usage of waste rock will be realized.

Essential Factors

While designing kilns for spalls two main factors must be held in mind. One is the great resistance to gas flow; the other, difficulty in distributing the heat itself properly. If a mixed feed kiln is to be used, the design need not be radically different, except it must not be too large in diameter nor too high, but with the best possible charging



Spall lime kiln designed by Victor J. Azbe for mixed feed



Spall lime kiln designed by Victor J. Azbe for gas fuel, introducing many novel new features

equipment, preferably a hand-drawing system, and a high pressure blower. The first of the two sketches shows this type of kiln.

When natural gas is to be used, the kiln has to depart widely from the conventional vertical kiln. The second sketch shows it. It should prove entirely practicable, controllable, capacious, highly efficient and quite cheap to build and operate.

Although in appearance the kiln design may appear simple, in fact many items have to be considered, some extremely complex. There is the matter of combustion of heat transfer, of flow of gases, of flow of solids, of strength of materials, of expansion of materials, or refractory resistance, of gas volumes and temperatures, of rates of flow and frictional resistances of time criterion of contact, of cracking of gases, of regulation of temperatures, gas distribution, proper air proportioning, elimination of leakage, insulation, recarbonization and control over flow of lime.

There are the items of drawing gates and charging gates, of outside and inner burners, of design and proportioning of preheating, burning and cooling zones, of gas offtake and recirculating systems, and so on into the finest details. Much that is incorporated was tried in gas plants designed by the writer, which now are operating successfully.

Special Features

Some of the main features in detail from the kiln base are:

(1) Draw gates are so located that lime may be preferentially drawn from any desired kiln section and draw gates are of special, tried design.

(2) Specially designed cooler for admission of air suitably humidified and of its proper distribution and preheating.

(3) A novel design of burning zone, creating by angle of repose of lime a large area for uniform gas entrance among the pieces of lime.

(4) A specially designed retarding arch, utilized also for gas admission to the center of the shaft.

(5) Under the adapted arrangement, one is enabled to control gas admission to either side, either end, or center of shaft. Gas may be shut off from one section or greatly increased at another.

(6) The burners are of a special design and fully tried. They admit gas at either high or low pressure or both simultaneously. They individually meter the gas by a simple, fool-proof device allowing exact adjustment of the burners and the bringing of them in step with each other. With other features of the burner ensemble, any kind of flame may be obtained, of high or low luminosity, intense or mild, oxidizing or reducing, short or long rolling. The gas stream at will may be diluted with nitrogen and carbon dioxide from the kiln top.

(7) The kiln shaft, cooler and storage zone are in vertical and horizontal dimensions carefully apportioned, taking full account of the laws of flow of gases and solids, of rates of preheating, cooling and calcining. The shaft is equipped with suitable observation openings that can also be utilized when the charge hangs, or to dislodge possible lime accumulations on kiln walls.

(8) The kiln lining is designed for long lasting service, in part along the lines of the writer's kiln designed for National Carbide Co. This gas kiln, although forced, was in service continuously for a period of two years, and although small in dimension and calcining large rock, produced in excess of 30,000 tons of lime, which doubles any previous record for gas kiln lining.

(9) The kiln top is also novel, the charging gate is of special design, effective, tight, but quite simple and well tried in practice. It is of a type tending to make kiln storage space more effective as it does not protrude within the kiln any great distance.

(10) The gas off-take is submerged, instantly supplying fresh stone to kiln as lime is drawn at the bottom. The gas is drawn preferentially from the center of the shaft. The storage zone acts also as a drying chamber.

(11) By a special feature any air leaking into the kiln on top is intercepted and cannot enter the gas off-take to dilute the CO_2.

(12) The kiln is thoroughly insulated, which can readily and cheaply be accomplished.

(13) Control over combustion is such that virtually ideal combustion is possible, that with highest CO_2 with least oxygen and still no CO. All the burning takes place within the kiln, external heat losses are reduced to a minimum. Lime is fully cooled and the heat recovered. Gases on top are also well cooled due to tremendous surface that spalls present.

(14) In view of the above, efficiency is virtually equal to the best obtained with mixed-feed kilns. The CO_2 ordinarily would be less, as natural gas is lower in carbon and higher in hydrogen. This, however, is offset by the fact that excess air is eliminated, increasing the CO_2; also top leakage is eliminated, again increasing the CO_2, and thirdly, conditioned air is admitted to the cooler, capitalizing in some degree upon heat of hydration. The CO_2 will be in close neighborhood of 38%, exceeding by far the rotary kiln.

(15) Capacity possible is very great, but a small kiln would produce 100 tons of lime per day.

(16) Fuel consumption will be very low, about 3000 to 4000 cu. ft. per ton of lime, which, with gas at 15 cents as obtainable in some localities, would make the fuel cost less than 60 cents. Even where natural gas is considerably higher, fuel cost should not much exceed 75 cents.

(17) Considering the control that one may exercise over the lime drawing process and considering the control one has over combustion, and the possibilities for observation, the lime may be given any possible desired characteristics, soft burned or hard burned; there will be no combination with sulphur found in even the best coke, and no contamination with ash from coke; there will also be no chance whatsoever for recarbonization that exists in mixed-feed kilns; and so the available CaO will be high.

(18) The kiln as a whole is designed for lowest first cost, highest capacity, greatest efficiency, low operating cost, and utilization of a size stone that often is a waste.

Publications Received

Proceedings of the Tenth Annual Asphalt Paving Conference; 1932; Part 1—Engineering and economic papers; Part 2—Technical reports and papers. Published by the Asphalt Institute, New York City. There is a great deal of interesting and helpful material in this volume for the aggregate producer, although the various papers, naturally, deal more with highway construction methods than with aggregates as such. In answer to the widespread interest of aggregate producers in plants and equipment for making asphalt road mixes, no better source of such material can be found. It is presumed that a limited number of copies of the proceedings are available to those particularly interested. The address of the Asphalt Institute is 801 Second Ave., New York City, and 206 Sansome St., San Francisco.

Marble Prospects in Giles County, Virginia; by A. A. L. Mathews. Virginia Geological Survey Bulletin 40. This book is one of a series being published on the mineral and allied resources of Virginia, each based on expert field and laboratory investigation. The issue treats of one of the undeveloped mineral resources of Giles County which has promise of commercial importance. It discusses the distribution, properties, geologic relations, and types of marble found in the county and describes briefly uses, quarry sites, and methods, and other features connected with development of the deposits. Twelve varieties of marble are described, some of which are illustrated by plates in colors, and there is added a section on the petrography of the marbles.

Cement; by B. W. Bagley. Statistical appendix to Minerals Yearbook 1932-33, U. S. government printing office, Washington, for sale by Supt. of Documents, Washington, D. C., price 5c. The issue offers detailed statistics on production, shipments and stocks on hand, the amount of cement burned with various fuels, imports, exports, world production and figures on special cements.

Engineering Geology and Mineral Resources of the Tennessee Valley Authority Region. By E. C. Eckel, Geologist, T. V. A., Geologic Bulletin No. 1. This publication is designed to make available, in condensed form, a summary of present knowledge of the chief mineral resources and of the engineering geology of the region tributary to the dams and power plants of the T. V. A.

Digest of Foreign Literature

By F. O. Anderegg, Ph. D.
Consulting Specialist, Long Island City, N. Y.

Experiments with Cement in Aggressive Solutions. The chemical reactions taking place when various aggressive solutions come in contact with portland cement concrete are compared with the weight increase of the concrete. The cements experimented with included a standard and a high early strength portland cement, trass cements with ratios 30/70 and 50/50, iron portland, and blast furnace cements (slag) and an aluminous cement. In distilled water the first loses the most lime during the first few weeks and thereafter; little loss is experienced except moderate quantities of both CaO and Al_2O_3 from the aluminous cement at all periods. In $MgSO_4$ lime is dissolved and larger quantities of lime are removed from all the cements, but after a few weeks the action is almost negligible. The amount of sulfate taken up by the cement is very considerable during the first and second four weeks and even after half a year of contact the amount held is high. In sodium sulfate the lime taken up by the solution is much less but the aluminous cement loses appreciable amounts of R_2O_3.

From this solution the amounts of sulfate taken up by the cement are much smaller than from the corresponding magnesium salt solution. Ammonium sulfate is extremely aggressive, extracting large quantities of lime from all cements, even after half a year and also giving up to the cement large amounts of sulfate radical. Calcium sulfate is least active of the sulfates in agreement with its low solubility and due to the presence of a common calcium ion which prevents base exchange. $MgCl_2$ solution was found to be most aggressive of all. The change in weight of the specimens followed extent of the attack, there being a continuing increase. An interesting point was the weight increase in the aluminous cement specimens which was much greater than corresponded to any reduction in strength. *Tonindustrie Zeitung* (1935) **59**, No. 57, p. 677; No. 58, p. 690.

New Experimental Results with Gypsum-Slag Cements. Results are reported by L. Blondiau on a Belgian cement made by mixing very finely ground high calcium blast furnace slag with gypsum. Compressive strengths on a 1:1.6:3.7 concrete of medium soft consistency gave 2370, 4500 and 8200 lb. per sq. in. after 3, 7 and 28 days, respectively. Bond strength to steel, impact strength and elasticity compared favorably with standard portland cement as did also the volume change and permeability. In resistance to aggressive solutions this cement seemed to give better results than did portland. *Tonindustrie Zeitung* (1935) **59**, No. 47/48, p. 571.

The Effect of Fluorides on the Thermal Synthesis of Calcium Silicates. S. Nagai and Y. Kosaki continue their experiments by adding fluorspar to a mixture of 2 moles of lime and 1 of silica and then heating for 1 hour at 1000, 1100, 1200, 1300 and 1400 deg. C., with and without adding about 1% of the fluoride. Four compounds may be found in the heated mixtures, monocalcium silicate, tri-disilicate, di-silicate, and tri-silicate, beside free lime and free silica. By titrating with 0.1*N*, HCl in menthanol using 0-nitrophenol as an indicator, the lime in the tri- and di-silicates is determined, while titrating with the same reagent in water gives part of the tricalcium disilicate. The total and free lime and silica are determined in the usual way and the amounts of the several compounds are calculated. Free lime occurred to the greatest extent in the material heated at the lower temperatures and was appreciably reduced by the presence of fluoride. The higher the temperature the less the amount of free lime and silica and the greater the amount of di-silicate. The greatest amount of tricalcium silicate seems to be formed at 1000 deg., falling off at higher temperatures. About three-fourths of the fluoride remains in the mix after heating. *J. Soc. Chem. Ind. (Japan)* (1935) **38**, No. 6, p. 229B.

The Determination of Free Lime in Portland Cement Clinker and in Ground Cement. An improvement in the determination of free lime is offered by B. Bukowski. From 0.5 to 1 g. finely ground cement is weighed into a conical flask having a long neck and 50 c.c. of neutral, water-free ethyleneglycol is added with strong shaking. The temperature is raised to 60 deg. C., a cork is tightly applied and the flask is shaken mechanically in a water bath maintained at this temperature for 30 minutes. The solution is filtered on a Buchner filter and after washing the filter paper, 4 to 5 drops of phenolphthalein and of naphtholphthalein are added and it is titrated with 0.1*N* HCl to a deep brown red. *Tonindustrie Zeitung* (1935) **59**, No. 52, p. 616. Another method has been suggested by Anton Hanslitschek which has yielded him good results: Weigh 1 g. cement ground quite fine into a 50 c.c. casserole and add 10 c.c water-free glycerine and rub well with a rod. Then place in an oven at 100 deg. C. for 15 minutes. The suspension is transferred to a conical flask and heated in boiling water and filtered through a glass filter. Then the filtrate is titrated with 0.1 *N* HCl, which has been standardized against CaO dissolved in hot glycerine. *Tonindustrie Zeitung* (1935) **59**, No. 46, p. 556.

The "False" Set of Portland Cement. This phenomenon is defined by W. Watson and O. L. Craddock as the stiffening of a paste of cement and water a few minutes after mixing. It is most noteworthy with certain finely ground cements which have only been mixed for about two minutes and may be sufficient to prevent the penetration of the setting time needle. To determine, if possible, whether any adverse effect follows prolonged working, a set of 6-in. cubes was made up, working as rapidly as possible, while in another set the gaging period was prolonged and the mix was allowed to stand 20 minutes before molding. The results were identical, indicating that the only practical effect from the false set is to be sure that the mix is sufficiently workable, to be able to place it properly. *Cement and Cement Manufacturing* (1935) **8**, No. 6, p. 143.

Some Volume Change Measurements in Hardened Cements. Portland cement clinker was ground with soluble silica containing some alumina by S. Nagai and K. Matsuoka. Compression and flexural specimens were made up at earth dry consistency according to the Japanese standards and also in plastic mortar. In the former the blended cements gave higher results than straight portland, but the reverse was true in the softer cosistency. When stored in combined storage (6 days wet followed by 21 dry) the specimens made from the high silica cements shrank more, but in sulfate solutions they expanded less than straight portland cement specimens. *J. Soc. Chem. Ind. (Japan)* (1935) **38**, No. 5, p. 173B.

New Publications

The Chemistry of Cement and Concrete, by F. M. Lea and C. H. Desch (published by Longmans Green & Co., New York City, price $9.50). The authors are English and the book is printed in London. It is the latest and best and most complete treatise on the subject in the English language and should be in the working library of all cement company laboratories. The subject matter is compiled from cement and concrete literature in all languages, much of it from our American journals. The authors are research chemists and physicists and deal with their subject authoritatively. It is not a manual on cement manufacture and contains little cement mill operating data or experience, but it does bring together in one book an excellent digest of recent current literature on the constitution and characteristics of cement and concrete, hitherto widely scattered and much of it not available to the plant chemist.

Prices Bid—Contracts Let

Fort Peck Dam, Mont.: Contracts awarded J. L. Shiely Co., St. Paul, Minn., for 325,000 cu. yd. of coarse gravel, 193,000 cu. yd. of fine gravel, and 391,000 cu. yd. of sand, for concrete, for total of $554,140, or an average price of a little less than 61c per cu. yd. Contract awarded Becker County Sand and Gravel Co. and J. L. Shiely Co. jointly for 1,250,000 cu. yd. of gravel for toes of upstream slope of dam, for $662,500, or an average price of approximately 53c per cu. yd.

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Pickwick Landing Dam, Tenn. (TVA): Contract awarded Cumberland River Sand Co., Nashville, Tenn., for between 1,000,000 and 1,200,000 tons of sand at approximately 50c per ton.

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Mount Pulaski, Ill.: Lake Fork township let contract to R. A. Cullinan, Tremont, for 4125 cu. yd. of road gravel at $1.67½ per cu. yd., delivered; 3960 cu. yd. at $1.71.

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Lincoln, Ill.: Broadwell township received bids on graveling 27 miles of highway as follows: G. E. Hoffmann, section 1, $1.75 per cu. yd.; section 2, $1.53; R. A. Cullinan, Tremont, section 1, $1.59½. Section 1 calls for 5600 cu. yd. and section 2 for 15,200 cu. yd.

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Janesville, Wis.: Bids for producing 180,000 cu. yd. of gravel for WPA road projects ranged from 40c to 44c per cu. yd. The bids in effect cover the item of equipment, rental and operating costs. The WPA will furnish labor for the jobs under the relief set-up.

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Illinois WPA contracts of recent date include (delivered on job prices in each instance unless otherwise noted): Sindler Construction Materials Co., Kankakee, 175 tons concrete sand at $2.00, 1000 tons crushed stone at $1.83; East St. Louis Stone Co., East St. Louis, 220 tons Grade A crushed limestone at $1.65; Ozark Minerals, Cairo, 6500 cu. yd. pit-run gravel at 10c; Dearborn Materials Co., Chicago, 382 cu. yd. Grade B crushed limestone at $2.20; Morton Sand and Gravel Co., Wayne, 142 cu. yd. wash torpedo sand at $2.375; Aug. Johnson Sand and Gravel Co., Rockford, 300 cu. yd. washed sand and gravel at $1.35; Consumers Co., Chicago, 128 cu. yd. crushed limestone, Grade A, at $1.35, 170 tons ½ to ¾-in. at $1.04; Materials Service Corp., Chicago, 950 cu. yd. limestone screenings at $1.00, 270 tons, Grade A, at 98c; Jesse Sporanza, Westville, 3425 cu. yd. pit-run gravel (f.o.b. plant) at 25c; Howard H. Dawson, Milford, 1700 cu. yd. pit-run gravel (f.o.b. plant) at 15c; Decatur, Hydraulic Sand and Gravel Co., Decatur, 1600 cu. yd. sand to pass No. 10 mesh, at 90c; Charles Patton, Mahomet, 2600 cu. yd. pit-run gravel (f.o.b. plant) at 35c; Read Bros., Tower Hill, 4500 cu. yd. pit-run gravel (f.o.b. plant) at 10c; Geo. W. Bansan, Bloomington, screened gravel, 1-in. down, 5000 cu. yd. at 30c; Sycamore Sand and Gravel Co., Sycamore, screened gravel crushed ¾-in. to ¼-in., 1500 cu. yd. at 50c.

Highway Congress

COMING annual Convention-Road Show of the American Road Builders' Association at Cleveland, Ohio, January 20-24, is expected to be the best attended in many years. The national highway program for the current year calls for expenditure of over a billion dollars. The association is active in fighting gasoline tax diversion and in promoting the contract system of public works. Its efforts deserve the support of all rock products producers.

—THE EDITOR.

New Chief Geologist of U. S. Geological Survey

Dr. Gerald F. Loughlin has been appointed chief geologist of the United States Geological Survey, effective October 1, succeeding Dr. Timothy W. Stanton, retired. Dr. Loughlin will be remembered for his contributions to Rock Products and as a speaker at some of the annual conventions of the National Crushed Stone Association. His article on "Usefulness of Petrology in the Selection of Limestone," for concrete aggregates, in Rock Products, March 17, 1928, has been referred to as a classic in nearly all subsequent literature on the soundness of aggregates. He has been with the Geological Survey since 1912 and has done much valuable work in various phases of economic geology.

Trusteeship Continued

Marianna Lime Products Co., Marianna, Fla.: Federal court has continued the trustees in charge of the property and given creditors until February 10, 1936, to file claims. The company is reorganizing under federal law 77B.

Increasing Output

Erin Sand and Lime Co., Erin, Tenn., has increased its output materially, now employing about 50 men, including 20 cutting cord wood. An office has been opened in the Marable building. G. W. Burgess is general manager and E. W. Rauscher is sales manager.

Kill City Crusher Project

Tulsa, Okla.: Local producers apparently have been successful in protesting the purchase of a rock crusher by the city to supply 37,500 tons of crushed stone for local WPA projects. One local producer had offered to lease his quarry on a 6c per ton royalty basis.

Enlarges Offices—New Laboratory

National Gypsum Co., Buffalo, N. Y., is doubling its office space at 190 Delaware Ave. The additional space will include a research laboratory and the engineering and purchasing departments.

Takes Glass Wool Output

United States Gypsum Co., Chicago, Ill., has been named sales agent for the Owens-Illinois Glass Co.'s output of glass wool for insulating purposes.

New Uses—Glass and Rock Wool

Owens-Illinois Glass Co., Toledo, Ohio, is selling glass wool to orchard growers who use strips of it around trees to repel worms. The worms, it seems, are unable to find a foothold on the glassy surface. Large amounts of glass wool are being used for filters in air-conditioning equipment.

New Plant

Newark Plaster Co., Newark, N. J., has let a contract to the Industrial Engineering Co., New York City, for a new gypsum plaster plant to cost approximately $275,000. F. V. Budell is the company's engineer.

Sewage Filter Rock

Quartzite Stone Co., Salina, Kan., has received an order for 65 cars of crushed stone for sewage filters at Hays, Kan. It is said this is the only available rock that will fulfil specifications. A new crusher to make smaller sizes has been added to the plant. In opening new parts of the deposit a heavy black rock was encountered which is believed to contain gold, silver and other rare ores.

New Gravel Plant

Walter B. Roselip, Santa Margarita, Calif., has opened a new sand and gravel plant operated with a cableway excavator. Gilbert conical screens are used for washing and sizing. Capacity is 250 cu. yd. daily.

Mortgage Foreclosed

Geyer Sand and Gravel Co., Santa Cruz, Calif., has been taken over by the Santa Cruz Bank of Savings and Loan through a foreclosure sale. The bank, which held a mortgage on the property, was the only bidder—its bid $2500.

Uses RFC Loan

Pioneer Sand and Gravel Co., Seattle, Wash., whose plans to make improvements costing about $150,000 were announced in Rock Products, November, p. 21, obtained a Reconstruction Finance Corporation loan of about $100,000, according to later reports. This is the largest loan to a sand and gravel producer that has been announced so far.

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of November 16.

New England

37332. To cancel commodity rates on **stone,** broken or crushed, from Ashley Falls to Greenfield and Millers Falls, Mass., and from West Stockbridge to Malden, Mass., as published in Item 520 of N. Y. N. H. & H. R. R. I. C. C. F3392, and apply class rates. Reason—Obsolete.

37359. To amend Agent Peel's I. C. C. 2651 naming commodity rates on **granite, marble, limestone, sandstone, soapstone and cast stone,** from Eastern points to stations in the state of Missouri, by eliminating all origin stations on the B. & M., B. & M. L., Me. C. and S. V. R. R., except certain B. & M. stations. To cancel obsolete rates.

37426. **Crushed stone,** minimum weight 50 net tons, from Lynn, Mass.

To	Prop.
Brunswick, Me.	$1.40
Gray, Me.	1.40
Waldoboro, Me.	1.60

Per ton of 2000 lb. Reason: To enable rail carriers to obtain a haul on traffic which would otherwise be secured locally.

Trunk

Sup. 1 to 34079. **Limestone,** ground or pulverized, C. L., minimum weight 60,000 lb., to Hickory Valley Railroad stations from Frederick Group, $2.90; and from Kutztown Group, $2.80 per net ton.

Sup. 1 to 34083. **Stone,** natural (other than bituminous asphalt rock), crushed, carload, (See Note 2). Rates in cents per net ton.

	From		
To	Rock Hill	Penning-ton	Monocacy
Seabright	150	120	150
Manasquan	150	130	140
Point Pleasant	150	130	140

Sup. 1 to 34098. **Crude fluxing limestone,** C. L., (See Note 2), from Annville, Myerstown and Palmyra, Penn., to Wheeling, W. Va., $1.51 per gross ton.

34102. **Crushed stone,** coated with tar, oil or asphaltum, in bulk in open top equipment, in straight carloads,* (See note 2.) from Monocacy, Penn., to Hancock, Md., $1.77 per net ton plus emergency charge.

34105. **Marble or stone chips or granules; also stone dust,** C. L., minimum weight 50,000 lb., from Whiteford, Cardiff, Md., Delta and Slate Hill, Penn., to Orangeburgh, N. Y., 21c per 100 lb. plus emergency charge.

Sup. 1 to 34105. **Marble or stone chips or granules, also stone dust,** C. L., minimum weight 50,000 lb., from Advance and Gladhill, Penn., to Orangeburg, N. Y., $3.78 per net ton.

34109. **Limestone,** ground or pulverized, C. L., minimum weight 60,000 lb., to points on the Delaware and Northern Railway, Harvard, Gregorytown, Shavertown, Jacksonburgh, Arkville, N. Y., and various, from Buffalo, N. Y., rates ranging from $2.50 to $2.60 per net ton; from Blakeslee, N. Y., rates ranging from $1.90 to $1.95 per net ton. Reason—Proposed rates are based on scale in I. C. C. Docket 25220, plus 25c a ton.

34117. **Stone, crushed, slag, gravel and/or sand,** coated with oil, tar or asphaltum in open top equipment, (See Note 3)*, to stations on the B. & O. R. R., Cumberland, Md., and west, and all stations on the Western Maryland Ry., from Marion, Va., rates ranging from $2.13 to $2.87 per net ton, from Roanoke, Va., rates ranging from $1.83 to $2.59 per net ton plus emergency charge.

34119. **Limestone, broken, crushed, ground or pulverized,** carload, minimum weight 60,000 lb., from Pleasantville, N. Y., to Fulton, N. Y., $2.25 per net ton.

34120. **Crushed stone,** carload, from Monocacy, Penn., to Lakewood, N. J., $1.40 per net ton.

34123. **Limestone, crude, fluxing, foundry and furnace,** C. L., from Bellefonte and Pleasant Gap., Penn., to Riddlesburg, Penn., $1.13 per gross ton. Reason—Proposed rate is comparable with rate to Saxton, Penn.

34136. **Stone,** crushed, coated with tar, oil and/or asphaltum, in bulk, in open top equipment, in straight carloads* (See Note 2), from Bound Brook, N. J., to stations on the S. I. R. T. Ry. Cranford Jct., N. J., Gulfport, New Brighton, New Dorp, Tottenville, N. Y., and various, rates ranging from 93c to $1.23 per net ton.

*Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so specify on shipping orders and bills of lading.

Central

44573. To cancel present rate of 14½c per 100 lb. on **ground gypsum,** C. L., minimum weight 80,000 lb., from Alabaster and National City, Mich., to Battle Creek, Grand Rapids, Kalamazoo, Niles, Vicksburg and Watervliet, Mich.

44633. (Can. Frt. Assn. File 749-2-Sec. 1) —To establish on **sand,** C. L., also **silica sand,** not ground or pulverized, C. L., from Ottawa, Ill., district and Muscatine, Ia., to points in Canada (See Note 3), rates ranging from $3.10 to $5.04 a net ton.

44634. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), or **gravel,** in open top equipment, C. L., from Cleveland, O., to North Randall, O., 40c per net ton.

44636. To establish on **sand,** naturally bonded moulding, in all kinds of equipment, C. L., from Atlantic, Penn., to McKees Rocks, Penn., 140c per net ton.

44661. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica), and **gravel,** in open top cars, C. L., from Buffalo and Black Rock, N. Y., to Fredonia, Laona, Norton's, Gassadaga and Moon's, N. Y., 80c per net ton.

44664. To establish on **slag** (a waste product of electrolytic furnaces), in open top cars, C. L., from Alloy, W. Va. (rates in cents per gross ton): To Ashland, Ky., 125; Columbus, O., 155; Hamilton, O., 190; Jackson, O., 140; Portsmouth, O., 140.

44665. To establish on **slag,** crushed commercial, in open top cars, C. L., minimum weight 80% of marked capacity of car, from Canton, O. (rates in cents per net ton): To Flushing, O., 95; Freeport, O., 85; Holloway, O., 90; Piedmont, O., 90; Stillwater, O., 80; Tippecanoe, O., 85.

44679. To establish on **sand,** except blast, core, engine, filter-fire or furnace, foundry, glass, grinding or polishing, loam, moulding and silica, carload, (See Note 3), from Terre Haute and W. Terre Haute, Ind., to Mt. Zion, Ill., 70c per net ton, to expire December 31, 1936.

44738. To establish on (a) **sand,** naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding; ground or pulverized sand), in closed equipment, C. L.; (b) sand, ground or pulverized, in all kinds of equipment, C. L., and (c) sand (except naturally bonded moulding; ground or pulverized sand), in open top equipment, C. L., (See Note 3), but not less than 60,000 lb. and 80,000 lb. for closed and open top cars respectively, to Fremont, O., from Muskegon, Grand Haven and Rosy Mound, Mich.; (a) 200c, (b) 220c, and (c) 185c per net ton.

44744. To establish on (a) **sand,** naturally bonded moulding, in all kinds of equipment, C. L.; sand (except naturally bonded moulding; ground or pulverized sand), in closed equipment, C. L.; (b) **sand,** ground or pulverized, in all kinds of equipment, C. L.; and (2) **sand** (except naturally bonded moulding; ground or pulverized sand), in open top equipment, C. L., (See Note 3), but not less than 60,000 lb. and 80,000 lb. for closed and open top cars respectively, from Thornton Junction, Penn. (P. R. R.), to all destinations in Illinois, Indiana, Iowa, Michigan, Ohio, Pennsylvania, New York, Delaware, etc., where rates were authorized from the Conneaut, O., group; also Cleveland, O., same rates as currently in effect from Conneaut, O., group, with the exception of Cleveland, O. Proposed rate to Cleveland, O., is on sand as described in (c), 120c per net ton, and in (a), 130c per net ton. (Not applicable on Ohio intrastate movement.)

44745. To establish on **stone,** fluxing, furnace or foundry, melting and/or refractory (unburned), in bulk, in open top cars, in straight or mixed carloads, from Kenneth and Logansport, Ind., to Sterling, Ill., 175c per net ton.

44780. To establish on **stone,** fluxing, furnace or foundry, melting and/or refractory (unburnt), in bulk, C. L., (See Note 3), from Ridgeville, Ind., to Muncie, Ind., 100c per gross ton.

44793. (Cancels W. D. A. 44182 and Sup. 1.) To establish on **dolomite,** roasted, C. L., (See Note 3), from Bettsville, Maple Grove-Narlo, Woodville and Martin, O., to points in West Virginia, Ohio, Indiana, Pennsylvania and New York, rates ranging from 105 to 280c per net ton.

44820. To establish on **ground or pulverized limestone,** unburnt, C. L., minimum weight 60,000 lb., from Carey, O., to Indianapolis, Ind., 185c per net ton.

44862. To establish on **slag,** crushed, in open top cars, Jackson, O., to Zanesville, Merriam (Gaysport), 105c; Stone, Hooksburg, 115c; Stockport, 125c; Roxbury, Tioga, 115c; Lowell and West Marietta, 105c per net ton.

44890. To establish on **agricultural limestone, crushed stone, crushed stone screenings,** C. L., in open top cars, from Carey, O., to points in Ohio. Representative rates in cents per net ton: Warwick, 105; Crystal Springs, 115; Orrville, 105; Fredericksburg, 115; Killbuck, 105; Brink Haven, 100; Gambier, 100; Spellacy, 95; Cavalle, 105; Nichols Suur, 105; Coshocton, 115; Lucas, 90; Loudonville, 95; Lakeville, 100; Burton City, 105; Wakatomika, 115; Trinway, 115.

44921. To establish on **crushed stone and crushed stone screenings,** in bulk, in straight or mixed carloads, in open top cars, C. L., from White Sulphur and Scioto, O., to Salem, O., 135c per net ton.

44922. To establish on **limestone,** unburnt, ground or pulverized, in box cars, in bulk or in packages, C. L., minimum weight 50,000 lb., from Rockford, O. (Proposed rates in cents per net ton.) To Akron, O., 150; Ashland, O., 140; Bucyrus, O., 130; Hudson, O., 150; Mansfield, O., 140; Middlefield, O., 180; Willoughby, O., 180; Youngstown, O., 180; Barberton, O., 150; Bedford, O., 150; Chardon, O., 180; Sandusky, O., 140; Detroit, Mich., 150; Flint, Mich., 165; Pontiac, Mich., 160; Buffalo, N. Y., 245; Erie, Penn., 215.

44924. To establish on **gravel and sand,** except industrial sand, in open top cars, C. L., from Brink Haven, O., to various destinations in Ohio. To representative points (rates in cents per net ton): To Akron 95, Barberton 90, Bellevue 100, Blissfield 50, Bucyrus 90, Cadiz 105, Canton 95, Cleveland 95, Columbiana 115, Columbus 90, Conotton 95, Coshocton 60, Dover 90, Dunkirk 105, East Rochester 100, Forest 100, Galena 80, Glenmont 40, Heath 85, Holmesville 60, Howard 40, Jewett 100, Killbuck 40, Lakeville 50, Lancaster 100, Lima 115, Loudenville 50, Mansfield 60, Marietta 115, Massillon 90, Mt. Vernon 50, Newark 80, Nichols Spur 40, North Jackson 105, Orrville 80, Pomerence 40, Robinson 85, Roscoe 60, Sandusky 100, Smithville 80, Steubenville 115, Toledo 105, Tunnel Hill 60, Uhrichsville 90, Walhonding 40, Wooster 60, Zanesville 85.

Southern

6194. To establish rates on **asphaltic limestone,** broken, crushed or ground, containing not more than 5% artificially added asphalt, in carloads (See Note 3), from Margerum, Ala., to points in Missouri on and south of the St. L.-S. F. Ry., St. Louis to Kansas City, Mo., not including St. Louis, Mo., on basis of mileage scale of rates based on the distances through Memphis, Tenn., and connections beyond.

9537. (Amdt. 2.) **Feldspar,** C. L. To provide for rates from Clinchfield R. R. stations, Erwin, Tenn., Minpro, Spruce Pine and Toecane, N. C., to Southwestern territory on basis of 14% of the going 1st class rates, observing Spruce Pine, N. C., rate as minimum, with rates from Black Mountain Ry. stations, Bowditch and Cane Branch, N. C., the nor-

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

mal differential of 24c per net ton over the rates proposed from Spruce Pine. It is further proposed to add the following lower Mississippi gateway points: Vicksburg, Natchez, Miss., Baton Rouge and New Orleans, La., with rates from Clinchfield stations, Erwin, Tenn., Minpro, Spruce Pine and Toecane, N. C., $6 per net ton, and from Black Mountain stations, Bowditch and Cane Branch, N. C., the normal differential of 24c per ton over the rate proposed from Clinchfield stations.

9888. **Phosphate rock** into Wales, Tenn., from Mulberry, Fla., for grinding and reshipment to Chicago, Ill. Proposed to extend the expiration date in connection with transit privileges until Dec. 31, 1936.

9919. **Slag, ground,** C. L., Lynchburg (when from beyond), Norfolk and Petersburg, Va., to Durham, N. C. To cancel, as obsolete, the present rate of $2.82 per net ton, C. L., and apply class rates.

9920. To establish **reduced rates on feldspar,** C. L., minimum weight 56,000 lb., to McIntyre, Ga.: From Erwin, Tenn., 294; from Minpro, Spruce Pine and Toecane, N. C., 282; from Bowditch and Cane Branch, N. C., 306c per net ton. Made with relation to rates applicable to Savannah, Ga., and Wilmington, N. C.

9925. To revise the rates on **asphaltic limestone** published in Sou. Ry. I. C. C. A-10146, from Cherokee, Colrock and Margerum, Ala., to G. M. & N. R. R. stations to be on the trunk line scale.

9957. **Limestone,** crushed, granulated, ground or pulverized, and **stone dust,** C. L., Dolcito, Ala., and Whitestone, Ga., to points in Southern Territory within a radius of 1500 miles. To establish rates, C. L., made on the same basis as applicable from Mascot, Tenn., as published in Supplement No. 27 to Agent Pope's Freight Tariff No. 227-B.

10033. To establish rates on **limestone,** ground or pulverized, in bags, in closed cars, C. L., minimum weight 60,000 lb., from Krause, Ill., as follows (cents per ton of 2000 lb.): Alabama, viz.: Birmingham, *236, †280; Mobile 234; Montgomery *261, †310; Tuscaloosa *236, †290; Mississippi, viz.: Columbus 225; Corinth 180; Greenville 252; Greenwood 243; Hattiesburg 234; Jackson 234; Meridian 225; Vicksburg 252; West Point 225; Winona 234; Louisiana, viz.: New Orleans 234; Tennessee, viz.: Humboldt 180; Jackson 180; Memphis 198; Union City 180. *Expires Dec. 31, 1935. †Becomes effective Dec. 31, 1935.

10075. **Dressed marble, limestone, sandstone and cast stone, blocks,** points in Southern territory to Ohio and Mississippi River crossings, St. Louis, Mo., Virginia points, Eastern port cities, and Washington, D. C. To reduce the carload minimum weight to 36,000 lb. To expire December 31, 1935.

10094. **Bituminous rock,** C. L., Big Clifty, Black Rock, Bowling Green, Garfield, Leitchfield, Rockport, and Summit, Ky., to Long Island R. R. stations. To establish rates on bituminous rock, C. L., reflecting the basis published in Agent Jones' Freight Tariff No. 470, I. C. C. No. 2486.

10103. To amend the present transit arrangements whereby wet **phosphate rock,** carloads, may be shipped from Mt. Pleasant, Tenn., to Wales, Tenn., to be dried, or dried and mixed and/or ground, and from Wales, Tenn., to Mt. Pleasant, Tenn., to be dried, or dried and mixed, and reshipped via the L. & N. R. R. to further destinations subject to a transit rate of 12½c per net ton, to provide for reshipment of at least 75% of the inbound weight in lieu of 82% as authorized at present.

10110. **Stone, coated,** carload, Kosmosdale, Ky., to Porter, Ind. To increase rate to 280c per net ton.

Western

C-41-119. **Sand and gravel,** carload, usual minimum weight, from Lyman-Richey Sand and Gravel Co. Pit, located 6.17 miles south of Fremont, Neb. Also Riverside Sand and Gravel Co., Inc., Pit, located 1.9 miles west of Platte River Junction, Neb., to stations in Iowa. Rates, to representative points, proposed: To Arcadia, 108½; Arthur, 115½; California Jct., 63; Denison, 100; Logan, 76½; Sioux City, 100.

D-41-120. **Limestone,** crushed or ground, in bags, C. L., (See Note 2), but not less than 40,000 lb., in open cars or 54,000 lb. in box cars, from Alden, Ia., to Sioux Falls, S. D. Proposed—10c per 100 lb.

Sup. 1 to D-41-120. **Limestone,** crushed or ground, in bags, carload, (See Note 2), but not less than 40,000 lb. in open cars or 54,000 lb. in box cars, from Hannibal, Mo., to Sioux Falls, S. D. Rates—Proposed, 280c per net ton.

C-41-121. **Sand,** naturally bonded moulding, in all kinds of equipment, carloads (See Note 3), but not less than 60,000 and 80,000 lb. respectively in closed and open top cars. **Sand** (except naturally bonded moulding, ground or pulverized), in closed equipment, carloads (See Note 3).

To	From— Berlin, Wis.	Doylestown, Wis.
Detroit, Mich.	$2.50	$2.40
Kalamazoo, Mich.	2.30	2.20
LaPorte, Ind.	2.00	1.90
South Bend, Ind.	2.10	2.00

To	From— Columbia Silica Company's Pit, Wis.; Pacific Sand Company's Pit, Wis.
Detroit, Mich.	$2.50
Kalamazoo, Mich.	2.30
LaPorte, Ind.	1.90
South Bend, Ind.	2.00

C-41-122. **Soapstone,** broken, carload, (See Note 3), from Junction City, Wis. Rates: Proposed, to Joliet, Ill., 150c per net ton; to Milwaukee, Wis., 110c per net ton.

D-151-1. **Feldspar,** carload, (See Note 1), but not less than 60,000 lb., from Duluth, Minn., when originating at Warroad, Minn., Kenora, Ont., or Lac du Bonnet, Man. Proposed rates in cents per 100 lb. To Chicago, Ill., 15; Milwaukee, Wis., 15; Sheboygan, Wis., 13; Sun Prairie, Wis., 13; Red Wing, Minn., 13; St. Paul-Minneapolis-Minnesota Transfer, Minn., 13.

Southwestern

6632. To add a new item to section 5 of S. W. L. Tariff 174-G, I. C. C. 2689, to permit stopping in transit of **clay or sand,** processed for decolorizing, filtering or water softening, carloads, at points in southwestern freight bureau territory subject to application "SW" and "TC" of Item 500-C and subject to rules and regulations published in Item 504-B.

6781. Establish a rate of 29c per 100 lb. on roasted **dolomite,** carload (See Note 2), from Dolly Siding, Mo., to Minnequa, Colo., and Pueblo, Colo.

Texas-Louisiana

9776-1-TX. Proposition from carriers to establish the following rates in cents per net ton on **sand and gravel,** carloads, standard minimum weight from Starrco, Tex., to Texas points shown: To Mission, 30; McAllen, 36; Pharr, 50; San Juan, 50; Alamo, 50; Donna, 50; Weslaco, 56; Mercedes, 60; Edinburg, 56, and Faysville, 60. Proposed rates are necessary to enable carriers to participate in the traffic in competition with the movement from wayside pits via trucks.

Illinois

8197. **Sand and gravel,** carload, from Chillicothe, Ill., to Dallas City, Ill. Proposed, 88c per net ton.

I. C. C. Decisions

15798. Cement from the Kansas gas belt. By division 2. Missouri-Kansas-Texas, Missouri Pacific and Colorado & Southern authorized, in fourth section order 12081, to establish rates over the route of the M.-K.-T., Council Grove, Kan., Missouri Pacific, Pueblo, Colo., and Colorado & Southern, from Chanute, Humboldt, Iola, Mildred and Fort Scott, Kan., and Dewey, Okla., to stations on the Colorado & Southern in New Mexico, the lowest that may be constructed over any line on the basis of scale IV rates prescribed in Western Cement Rates, 48 I C. C. 201, so as to meet the competition over their long line of the short lines, subject to a 50% circuity limitation.

16250. Silica Sand. Indiana State Chamber of Commerce vs. B. & O. et al. By the Commission. On reconsideration, additional amounts of reparation found due to complainant's member, the Hart Glass Manufacturing Co., under prior findings, 188 I. C. C. 99, from the Ottawa, Ill., district to Dunkirk, Ind.

Sand Shippers Seek Reparations

TWENTY-EIGHT Indiana manufacturers have filed suit in Federal Court against 15 railroad companies, seeking reparations of $131,778 plus $69,210 in interest. The suit climaxes a 12-year controversy over reduction in freight rates on silica sand shipments from the Ottawa, Ill., district.

New York Investigates Rates

A COMPLETE STUDY of railroad rates charged on highway construction materials has been ordered by the New York State Public Service Commission, and the first hearing has been scheduled for December 16. The action is prompted by a recommendation by the Division of Highways that such rates be standardized throughout the state. It is believed that uniform rates would assist producers in preparing bids for highway work and would be of use to the railroads in solving the problem of truck competition.

Rate Reduction Permitted

THE ARKANSAS Corporation Commission recently authorized the Missouri Pacific Lines to reduce rate on sand and gravel to 64c per ton from Alpha; Cross county, to Simsboro, Crittenden county. The reduction was authorized to meet truck competition.

Producer Loses Case

THE Delphos Quarries Co., of Delphos, Ohio, recently lost its suit against the I.C.C. and a group of railroads, by which it sought to have set aside a commission order fixing a mileage basis of shipments within specified portions of Ohio.

I. C. C. Upholds Exceptions

REFUSAL of the Oklahoma Corporation Commission and of the Arkansas Corporation Commission to add emergency charges on intrastate traffic to the existing rates on coal, coke, sand, gravel and related commodities has been upheld by recent decisions of the I. C. C.

Rate Cut Opposed

BECAUSE it discriminates against Oklahoma railroads which do not have outlets in Kansas and Missouri, or engage in interstate business, a proposed 20% reduction in rates on sand, gravel and crushed stone, to expire December 31, is opposed by the Merchants and Manufacturers Traffic bureau, Muskogee, Okla. It is specified that the movements must end in Kansas or Missouri, and the materials be for highway use. Such a reduction is now in effect in the states named.

However, the bureau is holding up its objection, on condition that rates for 1936 be mapped out during the next few weeks, and that if the reduction is granted, it apply also to intrastate movements.

Cement Products

Half Million Masonry Units for Three Michigan Jobs

PRECAST CONCRETE masonry units have found an active market in the Detroit, Mich., area as a building material to supply the increasing demand for homes and commercial buildings. Low-cost, medium-priced and high-priced homes, exhibition buildings, factories, warehouses and government housing projects have furnished a ready market for products manufacturers in 1935.

Oakland County Project

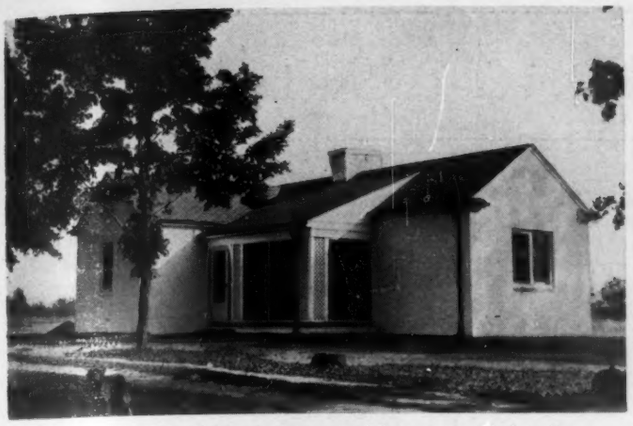
One of the outstanding jobs of 1935 is the Oakland County Subsistence Homestead project financed by a government appropriation of $300,000 and a donation of $550,000 by United States Senator Couzens. The site of the development, which will include the building of 150 six-room houses with attached garage, is on both sides of Commerce road 9 miles west of Pontiac, Mich.—in the heart of the lake district.

Water mains and roads have been laid, fire hydrants installed, gardens laid out, forest land cleared and lake frontage has been provided for all homesteaders. The houses, all of which are going up simultaneously, are of three types with four variations of each, none with basement. The first floor includes a living room, kitchen, dining alcove and utility room with three bedrooms and bathroom on the second floor.

Final appearance, stability and durability were considered by Federal Architect Barton P. Jenks, Jr., in the selection of low-cost building materials. Fifty of the homes are being erected with first story side walls of precast slag block furnished by a large Detroit producer and the remaining 100 are of regulation concrete block. The second story side walls will be of shingles and wide siding. Due to necessary furring, each frame-masonry unit house will be built at a cost of $40 to $60 in excess of a complete frame house, but the natural advantages of masonry units, in the architects' opinion, warranted the extra expense. To insure delivery, the contract of some 250,000 units was divided between three manufacturers.

Precast lintels, sills and chimney caps and a course of sand-lime brick are being utilized in each house. A "Hygiene" concrete septic tank, for 12 persons, is being installed for each dwelling. The project,

Interior of Sona Cement Products Co. plant at Detroit, Mich., showing up-to-date equipment



Low-cost cinder block house with precast joist floor

Cinder block covered with white stucco—$5,500

which will be completed early in 1936, is managed by a non-profit organization incorporated under Michigan laws as Oakland Housing, Inc.

Exhibition Building of Masonry Units

Ford Courtesy Building, a permanent exhibition hall designed on the order of the Ford building in the 1934 Century of Progress Exposition in Chicago, is now nearing completion. The exterior is of solid dimension block with an interior almost completely of concrete. Sixty thousand standard hollow cinder units make up the inside furring partition and 90,000 slag units comprise the interior walls. Macotta, the metallized concrete building unit, is utilized in the construction of ornamental columns.

Warehouse Walls of Cinder Units

Trenton Valley Distillers Corp., Trenton, Mich., is increasing its whiskey storage 2,500,000 gal. by the erection of four new warehouses. Each of these large buildings, four and five stories high, is being built with standard cinder block side walls. In all, 100,000 units will go into the construction. At this writing one building 232 ft. long by 70 ft. wide by 46 courses high, using 35,000 units, has been completed and a second one 57 courses high with 30,000 units is going up rapidly, with the others to follow.

Home Building

Construction of 1200 residences in the Detroit area so far in 1935 and the letting of an average of nine building permits daily has resulted in a nice products business for most local plants for the year. Some manufacturers have enjoyed such activity that it has been impossible to build up a stock pile.

In addition to the almost universal use of units for basements and center partitions, aggressive selling by manufacturers has resulted in a steadily increasing number of new homes with complete masonry walls in the medium and low-cost field. Cinder Block, Inc., Detroit, has recently furnished cinder units for 40 such homes.

Haydite ashlar concrete walls in modern dwelling

Oakland housing project at Detroit, Mich.

Distillery warehouse made of concrete block

New Machinery and Equipment

Self-Aligning Roller Bearing

LINK-BELT CO., Chicago, Ill., has developed a new line of bearing units known as the Shafer self-aligning roller bearing "Series 400." Shafer self-aligning double-row roller bearings are used in Link-Belt mountings, which are said to make an excellent combination for general service. These units are available for pillow blocks, flange bearings, hangers, and take-ups.

The advantages of the new combination

New bearing unit

are pointed out as: (1) Ability to carry (a) radial loads, (b) thrust loads, (c) radial and thrust loads combined. (2) Inherent self-alignment.

Self-alignment of the bearings is provided by concave rollers between convex outer races and a spherical inner race on the sleeve, which is free to deflect with a shaft temporarily misaligned or out of line because of inaccuracies of installation. The rollers travel in a true path on accurate races. Labyrinth seals protect the bearings. Bores are ground for direct shaft application.

Quarry Shovel

BUCYRUS-ERIE CO., South Milwaukee, Wis., has developed 85-B, a heavy duty shovel especially for quarry and mine service, combining the use of special, heat-treated alloy steels, modern electric-welded construction, and Ward-Leonard control.

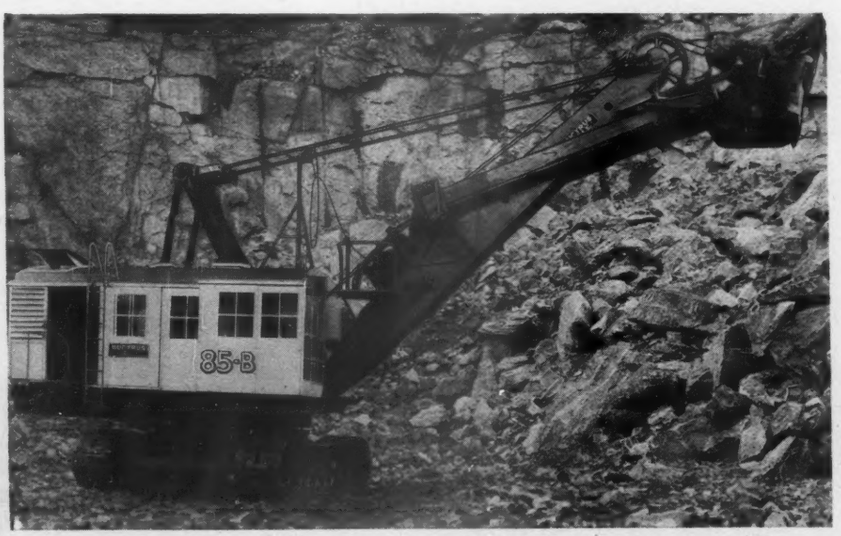
The base of the 85-B is of all-welded construction, and is supported on two, heavy cast side girders which form the frame for the caterpillar rollers and tumblers. The shovel carries a welded box-girder boom with outside dipper handles. The special rock dipper is made of two, strong, steel castings riveted and keyed together. The front is of manganese steel. The shape is designed to allow rock to enter easily; the flare out toward the bottom is designed to insure free dumping. The dipper opening is unobstructed because the bail is attached at the back of the dipper without the use of a padlock.

Full Ward-Leonard (variable-voltage) direct-current field control, with separately excited shunt-wound motors, permits the operator to complete the entire digging cycle without the use of brakes or clutches.

The new shovel weighs approximately 224,000 lb., and is designed to be loaded on four flat cars with a minimum of dismantling. It is convertible to dragline or crane. As a dragline it is designed to handle a 3-yd. heavy-duty bucket on a 65-ft. boom.

Duties Reduced

CANADIAN import duties on American machinery and parts will be reduced under the new reciprocity treaty. On all machinery not specially provided for the duty is reduced from the present 35% to 25% ad valorem.



Heavy duty shovel

Push-Button Switches

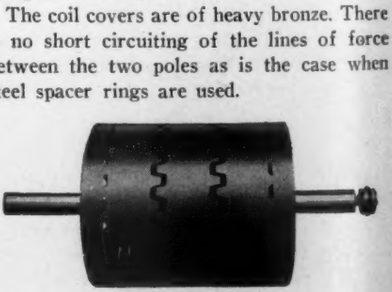
GENERAL ELECTRIC CO., Schenectady, N. Y., has a new line of watertight, push-button, master switches, mounted in molded phenolic-compound enclosures and and intended for naval-type installations or equivalent industrial applications. Each unit is operated by a molded-compound lever, thus protecting the operator from electrical contact with any metallic parts that might be "alive," and as many as four units may be mounted in one enclosure. The units, designated as CR2940 master switches, provide both normally open and closed circuits. Either momentary-contact units or a combination of momentary-contact and latched-in units are available.

Enclosed switch

High Intensity Magnetic Pulley

DINGS MAGNETIC SEPARATOR Co., Milwaukee, Wis., announces a magnetic pulley which has transverse and longitudinal radiating ducts for dissipation of heat. Each coil is wound upon its own bobbin, which forms the core and the two poles. Separate bobbins are mounted upon the pulley shaft, each bobbin being securely keyseated to the shaft. The outer and inner faces of the bobbin are corrugated. This structure presents a maximum radiating surface. Air passing through the radial and longitudinal openings insures a maximum dissipation of heat.

The coil covers are of heavy bronze. There is no short circuiting of the lines of force between the two poles as is the case when steel spacer rings are used.



Magnetic pulley

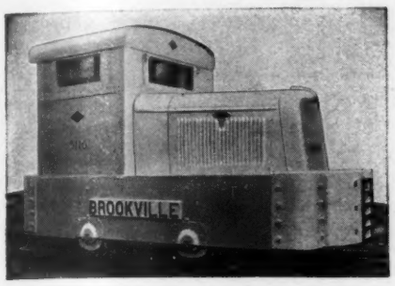
The magnetic pulley shaft is turned and polished. Each pulley is supplied with set collars, bronze collector rings with double contact brushes for each collector ring, dust-proof collector ring housing and approved steel switch cabinet in which is mounted a pilot lamp with bull's-eye indicator to show when current is flowing, fuse, switch and spe-

cial kick absorbing resistance to absorb the counter EMF.

Magnetic pulleys of the structure described have a magnetic attraction and range approximating 25% in excess of what was previously obtained.

Gasoline Locomotive

BROOKFIELD LOCOMOTIVE CO., Brookfield, Penn., has a new industrial locomotive powered with a Ford V-8 motor. It is made in sizes 2½ to 6 tons weight. The 80-hp. motor is connected to the drive axle by a four-speed Ford transmission through a double universal joint. The drive to the axle from the transmission is a roller chain. The clutch is a heavy-duty Ford. Other features include steel tires, nickel chromium axle, Timken roller bearings.



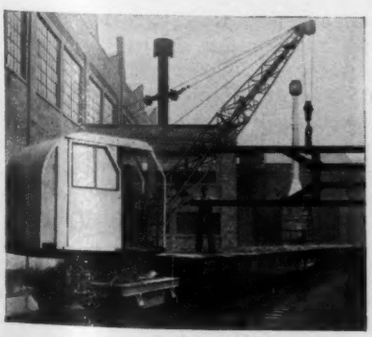
Industrial locomotive

Lightweight Rail Crane

HARNISCHFEGER CORP., Milwaukee, Wis., is making a new P & H "Bantam Weight" crane, self-propelling on standard rail wheels. The unit has all-welded construction. The 25-ft. beam of welded tubular construction provides a working radius and lifting capacities with 75% stability ranging from 7730 lb. at 10 ft. to 2360 lb. at 25 ft.

Powered by the Ford V-8 motor, the crane employs chain drive to each axle and exerts a drawbar pull from standstill of 3150 lb.—sufficient for handling from 2 to 7 freight cars depending upon their loads. Travel speeds range from 1.8 m.p.h. in low gear to 6.5 m.p.h. in high.

The crane has a wheelbase of 5 ft. 6 in., and overall length of 8 ft. 5½ in. The height of the entire machine is 10 ft. 6 in. and total weight is 21,000 lb.



Lightweight rail crane

Diesel Tractors

CATERPILLAR TRACTOR CO., Peoria, Ill., is introducing four new Diesel tractors known as RD-8, RD-7, RD-6, and RD-4.

Drawbar and belt horsepowers of the five new models are as follows:

	Drawbar hp.	Belt hp.
RD-8	95	110
RD-7	61	70
RD-6	45	51
RD-4	35	41
Thirty (spark ignition)	35	41

Many new features are included.

Exhaustive studies of present field requirements with their demand for added power have resulted in manufacture of the RD line, according to the manufacturer. The change, tests show, has meant increased production and decreased net costs in construction and earth-moving tasks. For example, a Diesel 75 pulling a 12-yd. scraper on a 650-ft. haul made round trips in 5.38 minutes, moving 55.8 cu. yd. of earth per hour, and at a cost of 7.8c per yard. An RD-8 on the same job made round trips in 3.93 minutes, moving 76.2 cu. yd. per hour at a cost of 5.8c per cu. yd. The latter, over a number of 8-hour work periods, showed a production increase of 36.5% over the Diesel 75. Increase in fuel cost was negligible, it is claimed.

Except for addition of the new Thirty, no change in the company's line of gasoline tractors is announced. Present models are the Twenty-two, Twenty-eight, Forty, Fifty and Seventy tractors.

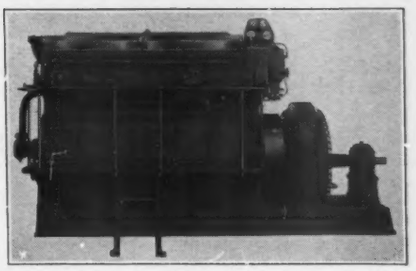
Enters New Business

Paul B. Reinhold, Oliver building, Pittsburgh, Penn., well known in the crushed stone and sand and gravel industries as a sales agent for these commodities, announces the organization of the Atlas Equipment Corp., dealers in contractors' and industrial equipment. The new company will represent in Pittsburgh territory the Thew Shovel Co., the Blaw-Knox Co., the Master Vibrator Co. and the Buffalo-Springfield Roller Co. Mr. Reinhold is president and treasurer; J. L. Baird, vice-president; L. B. Cummins, secretary.

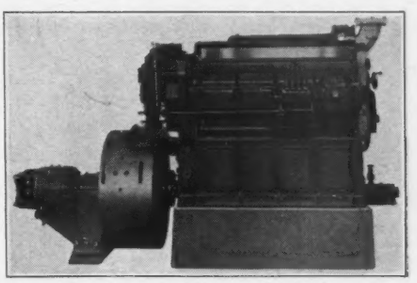
Diesel Engines

COOPER-BESSEMER CORP., Mt. Vernon, Ohio, announces its "N" line, which has four new developments: Steel throughbolts connect the cylinder heads to the bases, putting the cylinder block and centerframe in compression. Cylinder liners are suspended from cylinder heads instead of being pinched between heads and cylinder block. The patented wrist-pin construction is claimed to practically double the effective wrist-pin bearing areas. On all "N" line engines except the smallest type, a patented atmospheric-relief injection system is used.

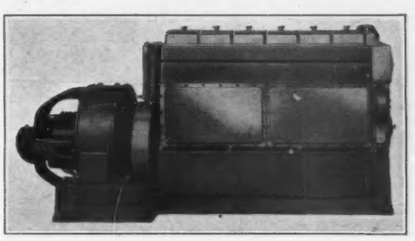
The largest is the Type GN, with power cylinders 10½ in. diameter, 13½ in. stroke, rated 50 hp. to 75 hp. per cylinder. Type EN—the intermediate size—has power cylinders with 8 in. bore, 10½ in. stroke, rated from 20 hp. to 47 hp. per cylinder. The smallest size is the Type BN, with power cylinders 5½ in. diameter, 7¾ in. stroke, rated from 10 to 22½ hp. per cylinder. Horsepower ratings of all three sizes depend on the speed and service.



Diesel engine, Type GN, in 3, 4, 6 and 8 cylinders



Type EN, in 3, 4, 6 and 8 cylinders



Type BN, in 3, 4, 6 and 8 cylinders

Gate Valve

THE KENNEDY Valve Manufacturing Co., Elmira, N. Y., recently announced a new line of rising stem bronze gate valves for 150 lb. working steam pressure and 250 lb. working water, oil or gas pressure. The operating mechanism employs solid wedge discs with no small quick-wearing parts which might cause trouble in service.

Gate valve

Production Statistics for October

Portland cement industry in October, 1935, produced 7,510,000 bbl., shipped 8,794,000, and had in stock at the end of the month 20,498,000. Production and shipments showed increases, respectively, of 12.5 and 4.2%, as compared with October, 1934. Stocks at mills were 2.6% higher than a year ago.

The output of a new plant located in Idaho, which began producing during the month, is included in the statistics here given which are compiled from reports for October, received by the Bureau of Mines, from all manufacturing plants except one.

The mill value of the shipments—55,651,000 bbl.—in the first nine months of 1935, is estimated at $85,203,000.

According to the reports of producers the shipments totals for the first nine months of 1935 include approximately 1,553,000 bbl. of high-early-strength portland cement with an estimated mill value of $2,977,000.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 163 plants at the close of October, 1934 and 1935.

RATIO (PER CENT) OF PRODUCTION TO CAPACITY

	October		Sept.,	Aug.,	July,
	1934	1935	1935	1935	1935
The month..	29.3	33.1	32.6	31.8	35.3
The 12 months ended	28.3	27.6	27.3	27.4	27.7

Price Raised

Cement prices in southern California have been raised 30c per bbl. to $1.85 f. o. b. cars Los Angeles to dealers, after reduction for sacks and discount. This is the second raise within 30 days, the first having been 15c on October 21. While there have been some increases in consumption the main reason for the advance is to place cement prices in this area on more nearly the basis of those of other sections in the United States. Prior to the increase last month prices here were the lowest in the country and even the new price is still below the average for the country.

New Company

Louis Ebbe Gravel Co., Waupaca, Wis., is the name of a new company which recently opened a new deposit using a Sauerman scraper excavator and Telsmith semi-portable plant. Power is furnished by a 65-hp. Le Roi gasoline engine. The capacity is 75 cu. yd. per hour. Mr. Ebbe was formerly with the Rassmussen-Ebbe Gravel Co., which is now out of existence.

Plant Leased

Western Indiana Gravel Co., Lafayette, Ind., has leased the plant of the Northern Indiana Sand and Gravel Co., South Bend. This makes the ninth plant of the Western Indiana company. A siding from the New York Central Lines is being installed.

Sand-Lime Brick Production and Shipments in October, 1935

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States and Canada. The accompanying statistics may be regarded as representative of the industry.

Ten sand-lime brick plants reported for the month of October, this number being the same as the number reporting for the month of September, statistics for which were published in November.

Average Prices for October

Shipping point	Plant price	Delivered
Dayton, Ohio	$13.00	$14.00
Grand Rapids, Mich.....	....	12.50
Detroit, Mich.	....	11.50
Mishawaka, Ind.	9.25	....
Syracuse, N. Y.....	14 00	16.00-20.00
Saginaw, Mich.	10.50	....
Sioux Falls, S. D.....	11.50	....
Madison, Wis.	11.50	....
Toronto, Ont., Can.....	12.00	13.50

Statistics for September and October

	September†	October*
Production	2,395,515	2,115,250
Shipments (rail)	44,000	129,000
Shipments (truck)	1,893,551	1,927,339
Stocks on hand.....	2,201,734	2,163,531
Unfilled orders	720,000	390,000

†Ten plants reporting; incomplete, two not reporting unfilled orders.
*Ten plants reporting; incomplete, three not reporting unfilled orders.

Can State Tax Itself?

Missouri Portland Cement Co., St. Louis, Mo., has asked the state supreme court to issue a writ of mandamus against the state auditor directing him to pay the company $18 for some sand, the bill for which did not include 18c for new state sales tax. The sand was sold to the state highway commission.

Attorneys for the company set out two reasons why the tax should not be assessed on highway department purchases. They were:

(1) It is a fundamental statute that the state can not impose a tax on itself or any of its departments unless the tax act makes specific provision for it.

(2) It is a violation of the highway road bond amendment providing the road bond shall be free from any legislative enactment.

The state auditor has been collecting the tax on all state purchases despite the ruling to the contrary of Attorney General Roy McKittrick. It was estimated the tax on state purchases will amount to $400,000 a year.

Portland Cement Pavement Yardage

AWARDS of concrete pavement for October, 1935, were announced by the Portland Cement Association as follows:

	Sq. yd. awarded during Oct., 1935	Total sq. yd. for year to date, Nov. 2, 1935
Roads	5,888,488	23,892,592
Streets	909,310	8,035,057
Alleys	18,031	132,938
	6,815,829	32,060,587

New Plant

Hubert Grose, Leadwood, Mo., has built a new small gravel plant on Big river to supply all demands for sand and gravel of the St. Joseph Lead Co.

Buys New Quarry

R. Newton McDowell Co., Kansas City, Mo., has purchased the crushed stone business of Edwin Cox, Fayette, Mo., and leased his quarry on a royalty basis. New equipment is being installed to bring the daily capacity up to 300 tons. A siding from the M. K. & T. railroad will be installed. The rock is a limestone.

Mica Production Growing

MICA HAS COME BACK into its own in the three counties, after having had to take a back seat to feldspar and kaolin for some years, according to an article in the *Spruce Pine* (N. C.) *News.* In practically all grades and kinds of mica produced locally the demand is close to the war peak. Only during the world war has the market for most grades of mica been so strong as it is now. Prices are good, but not up to the freak levels of 1918.

With several much improved methods in processing mica and in reclaiming it from kaolin operations the local output has increased remarkably in recent years. No accurate figures are available. From such estimates as experienced miners and producers of this section can make, it appears that the three counties are now turning out close to 75% of the total mica mined in the United States. Unfortunately this does not include the very heavy imports of India splittings, with which our higher paid labor cannot compete.

While the producers and processors have been improving their methods, users also have found out many new ways of employing mica. At present fine mica goes mainly into roll roofing, wall paper coating, rubber manufacture, architectural plastics and similar products. Punch and sheet micas are used extensively in all types of high-grade electrical apparatus and appliances.

Work that engineers are doing now indicates mica may find a greatly increased outlet as an extender in paint manufacture. In fact, tests have already been made showing that paint containing mica has many very desirable qualities.

Substitution of mica for felt in the making of asphalt shingles has been patented after a good deal of experimentation. The mica used costs less than the felt and results in a shingle that is in many vital ways much more desirable.

Other work done by different engineers indicates that certain kinds of very fine mica may become of great importance in the making of special ceramic products. A vast amount of research work is being done.

THE INDUSTRY

New Incorporations

Union Sand & Gravel Co., Morganfield, Ky. Incorporators are Joe M. Chick and J. H. Stoll.

Riverside Concrete Co., Inc., Riverside, N. J.; 2500 shares, no par. Agent is Anthony F. Marrazzo.

Texas Mica Co., Dallas, Texas. Incorporators are J. W. Crotty and F. A. Wright, 4516 Edmondson.

Newton G. Burns, Inc., Princeton Junction, N. J.; concrete products; $25,000. Agent, Newton G. Burns.

Walker County Stone Co., Houston, Texas; capital, $30,000. Incorporators are Tom Tellepsen, 4518 Park Dr., and E. A. Kruse.

Cumberland Mineral Co., Mount Sterling, Ky.; capital, $25,000. Incorporators are W. B. Townsend, M. L. Tipton and D. H. Tipton.

Ajax Gypsum Co., 231 S. La Salle St., Chicago, Ill.; to quarry gypsum; 50 shares par value common. Incorporators are Edna A. Hayes, Holly A. Wilcox and Irene Schoettle.

Collins Durax Co., Inc., Salisbury, N. C.; to deal in stone and granite; authorized capital, $50,000; subscribed, $300. Incorporators are George R. Collins, Emelie S. Collins and Jessie V. Edwards.

Atlas Sand & Gravel, Inc., Cranston, R. I.; capital, $25,000, divided into 50 shares common at $500 each. Incorporators are Americo Capparelli, Maria G. Capparelli, Cranston; Emily Cook, Wakefield.

Mecklenburg Granite Co., Charlotte, N. C.; to own stone quarries and sand and gravel pits; authorized stock 1000 shares no par value; subscribed, 3 shares. Incorporators are J. K. Bryan, E. F. Taylor and B. W. Parham, all of Oxford.

Apalachian Exploration & Mining Co., Canton, Ga.; to explore and mine gold, stone, gravels, phosphate, earth, oil and gas; authorized capital stock, $100,000 divided into shares of $100 each. Incorporators are Warren D. Keeter and James A. Keeter.

L. Thorn Co., Inc., 1319 Vincennes St., New Albany, Ind.; to manufacture concrete building blocks, drain tile, laundry tubs, vaults, cement products; capital stock, 180 shares no par value. Incorporators are Louis Thorn, Winfred G. Blackiston and Roland G. Blackiston.

M. O. Weaver, Inc., Des Moines, Iowa; to quarry rock products, sand, and other materials and supply materials used in concrete and other structures; authorized capital stock, $150,000, divided into 1,500 shares of $100. Officers are Merle O. Weaver, president-treasurer; John J. Stark, first vice-president; Paul Templeman, second vice-president; and B. L. Moore, secretary.

Personals

Garner A. Beckett, vice-president and general manager of Riverside Cement Co. since 1928, has been elected a director of the company.

J. Wallace Johnston of the Lone Star Cement Co. of Alabama has been elected a director of the Kiwanis Club of Birmingham for the year 1936.

Otto Voigtlaender, cement specialist, recently spoke before the Associated Engineers of Davenport, Wash., on a new burning process in the cement industry. Equipment for this process is being installed in the new kiln of the Spokane Portland Cement Co., Spokane, Wash.

Roll Varner recently gave a talk on South America before the Current Topics Club of Iola, Kan. Mr. Varner, who is with the International Cement Corp. plant at Montevideo, has spent over twelve years in Argentina and Paraguay. He is visiting his brother, Roy Varner, at Iola.

Charles M. Upham, engineer-director of the American Road Builders' Association, has been appointed consulting engineer for the Maryland State Roads Commission. Mr. Upham will continue his work with the A.R.B.A. at Washington, D. C., going to Baltimore when necessary to confer with the Maryland commission regarding the current state highway program.

L. C. Layman, superintendent of the sand and gravel division of the Dravo Construction Co., Pomeroy, Ohio, is pleased to announce, à la Mark Twain, that any reports of his recent death are "grossly exaggerated." Mr. Layman was in an automobile accident October 22, and one of the local newspapers listed him as a fatality victim. Mr. Layman, though "not feeling so good" after the accident, soon assured the newspaper that he is very much alive, and it published a retraction.

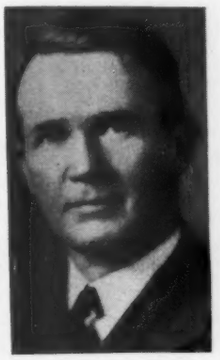
J. C. Van Doorn, sales manager, Minneapolis, Minn., of the Universal Atlas Cement Co., has retired, after more than 32 years' service with the company. Mr. Van Doorn began his work in 1903 in St. Louis, when the company was still a cement department of Illinois Steel Co. In 1907 he was made Northwestern sales manager; and in 1928, sales manager. **D. S. Day,** former assistant sales manager, succeeds Mr. Van Doorn as sales manager.

Obituaries

O. B. English, 60, pioneer in the gypsum industry and one of the founders of the United States Gypsum Co., committed suicide, together with his wife, Alice, at their Beverly Hills, Calif., home October 22.

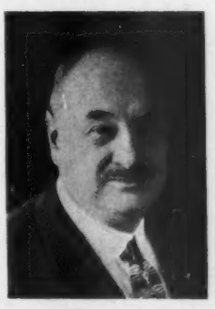
Victor N. Milnor, president of the H. C. Milnor Sand Co., Knoxville, Tenn., died October 26, after a day's illness, aged 48. He had operated the sand company since the death of his father, H. C. Milnor, five years ago. He was a nephew of Oliver King, president of the Oliver King Sand and Lime Co., Knoxville.

John Treanor, 52, president of the Riverside Cement Co. since 1927, met accidental death at his ranch near Warner's Hot Springs, Calif., on October 20. Early in life he began industrial adventures, working, as a youth, with a geological survey, a land clearing project and a sewer pipe business. In 1908, he became sales representative for the Pacific Portland Cement Co., transferring to the newly completed Riverside company's mill the following year. By 1915, he was general manager in charge of all operations. A member of the board of directors of the Portland Cement Association and a district trustee for The Cement Institute, Mr. Treanor served the cement industry in many important capacities. For the past 15 years he had been very active in public service work in southern California and was working on park and water developments and relief projects at the time of his death.



John Treanor

Charles E. Ulrickson, for many years vice president and general manager of Trinity Portland Cement Co., died at his home in Dallas, Texas, November 15, aged 63. Mr. Ulrickson had been active in the cement industry since 1906, when he became associated with the Cowham cement engineering organization. Before that time he had served as superintendent of public works in Jackson, Mich., and also as assistant postmaster. In 1916, he joined the Trinity company, and under his leadership it developed rapidly in Dallas, Houston and Fort Worth. Active as a counsellor on many cement committees and as a director of the Portland Cement Association, Mr. Ulrickson remained general manager of Trinity and even took on the additional duties of general manager of the Northwestern States Portland Cement Co. until a break in his health forced his retirement two years ago. He was interested in civic affairs and is remembered especially for having won for his community the "Dallas City Plan."



C. E. Ulrickson

William Forest Hayes, 48, salesman for the Consolidated Cement Corp., Fredonia, Kan., for the last seven years, died October 21 at his home in Kansas City.

Robert Whitman Lesley, 82, cement manufacturer, inventor and sportsman, died at his home in Bryn Mawr, Penn., November 9 after a short illness. Mr. Lesley's connection with the cement industry dates back to 1874, when he formed the firm of Lesley and Trinkle, shortly afterwards taking out patents for the manufacture of portland cement. He organized the American Cement Co. in the early 80's, the largest American cement enterprise up to that time, which later developed into the Giant Portland Cement Co., of which he was a director up to the time of his death. Collaborating with the late David Saylor, he made technical and commercial developments in cement. He was made the first president of the Portland Cement Association at its formation in 1902. Somewhat later he published, jointly with George S. Bartlett, a history of the cement industry. Mr. Lesley held honorary membership in the Portland Cement Association, the American Society for Testing Materials, the American Concrete Institute and the American and British chemical societies. He was donor of a cement laboratory to the University of Pennsylvania, of which he was an alumnus, and was in many ways active in welfare and civic work.

R. W. Lesley

Crushed Stone

New Franklin, Mo.: Howard county has contracted to buy a rock crusher.

Madisonville, Ky.: A rock crusher at Sunlight Quarry is being operated by WPA labor.

Quaker City, Ohio: Millwood township has opened the Leo Hall and J. E. Doudna limestone quarries near Eldon.

Armstrong, Mo.: The Armstrong Special Road District recently purchased a crusher of 80-cu. yd.-a-day capacity.

Miami, Mo.: The quarry near Miami has been reopened, to furnish stone for the road building program in Saline county.

Stevens Point, Wis.: Anticipating a municipal building program, the city recently purchased a stone quarry for $6000.

Warrensburg, Mo.: Johnson county court is contemplating undertaking a rock crushing project for hard surfacing of rural roads.

Stone Mountain Crushed Stone Co., Decatur, Ga., has surrendered its charter of incorporation. George Weiblen was president.

Kirkland, Wash.: King county leased a rock quarry on Raging river near Fall City for production of rip-rap for flood control use.

Harrisonville, Mo.: Grand River township purchased a rock crusher late in October and had it set up at once in anticipation of WPA projects.

Gower, Mo.: The town recently contracted to purchase a rock crusher upon the condition that a proposed WPA project will be approved.

Bloomfield, Iowa: WPA approved $174,635.09 October 24 for a quarry project in Davis county to provide material for farm-to-market roads.

Vinton, Va.: WPA has taken over the ERA quarrying project, allocating $4654. The rock will be used to repair and construct streets and sidewalks.

Lincoln, Kan.: WPA put 19 men to work in October in the Thompson and Ancell quarries producing stone for bridges to be built in Lincoln county.

Topeka, Kan.: A quarry and rock-crushing project was started in Shawnee county late in October as a WPA project, to provide materials for roads.

Albia, Iowa: The third rock quarry to be established as a WPA farm-to-market roads project in Monroe county was opened the latter part of October.

Newkirk, Okla.: Kay county has received $15,000 from WPA to operate a quarry on Waldschmidt hill. This is the first WPA project in the district.

Pueblo, Colo.: WPA labor opened a rock quarry 5 miles southwest of Pueblo late in October. Each of the nine counties in this district except Kiowa has WPA work under way.

Greenfield, Iowa: The quarry on the Adair-Madison county line is being operated by relief labor to supply limestone for the Grand River soil erosion area.

Durant, Okla.: A $10,750 rock crushing project has been started to provide material for building an armory. Purchase of a crusher is contemplated.

Centerville, Iowa: Appanoose county is looking for a quarry. It contemplates completing 7 miles of road between Unionville and Blakesburg this winter.

Centerville, Iowa: The Ed Climie quarry north of Columbus mine and the Harley Vinzant quarry north of Koonts coal mine are being operated under WPA.

Farragut, Iowa: Fremont County Soil Association contemplates opening a quarry this winter to be operated by CCC labor, supplying limestone to farmers at cost.

Grundy Center, Iowa: Overburden has been removed from portions of the quarry in German township, and quarrying will start as soon as WPA approval is received.

Overbrook, Kan.: The Elk township crusher has been tested and made ready for use so that production for roads may be taken up as soon as the WPA project is approved.

Liberty, Mo.: The Clay county court purchased three rock crushers in October from Gruendler Patent Crusher and Pulverizing Co., St. Louis, Mo., to further WPA road work.

Boonville, Mo.: Agricultural limestone at the rate of 100 tons a day has been supplied by a new crusher since the latter part of October at the Missouri Training School quarry.

Edwardsville, Ill.: CCC workers are stripping a limestone quarry on the Weder farm near Grantfork. Thousands of tons of stone are to be removed from there in the next two years.

Hudson, Wis.: St. Croix county has opened three limestone quarries—the Wilson quarry, the River Falls quarry, and the Benoy farm quarry. Farmers are buying the stone from the county.

Medford, Okla.: Grant county recently increased the size of its quarry crews to 42 men and is producing rock even though WPA funds and materials for building of bridges have been delayed.

Carrollton, Ga.: WPA recently released $5518 for a stone crushing project to be undertaken by Carrollton as the preliminary step in a street paving program. Work has started at Hays Mill.

Shelbina, Mo.: The City of Shelbina and the Shelbina special road district have purchased a rock crusher with equipment to load trucks and have set this up to furnish material for a WPA road project.

Coffeyville, Kan.: A WPA crushing and quarrying project is under way producing material to be used for street improvement next spring. The 5-acre Nannie H. Patchett quarry land has been leased for $300.

Cairo, Mo.: The rock crusher operated near Cairo for the last 2½ years has been moved to Gilliam. R. Newton McDowell Co., Kansas City, Mo., is operating the crusher for production of stone for farm-to-market roads.

Leavenworth, Kan.: The city recently signed a 2-year lease for a 2-acre quarry on the W. H. Unmessig property on Spruce St., paying $450. Work on the WPA program has started and bids for a crusher have been received.

Glasgow, Mo.: The Glasgow Special Road District has purchased a rock crusher of 130-cu.-yd.-a-day capacity for $3000 and is awaiting release of WPA money and the voting of a local bond issue to start work at Barnett's quarry.

Washington, Iowa: Washington county has been allowed $11,200 by WPA for operation of the county-owned quarry at Grace Hill—this being one-fourth the amount originally asked for. Stripping will be done with a drag line.

Murfreesboro, Tenn.: The state crusher was recently moved to Rutherford county, where it is available for farmers who wish to have limestone crushed free of charge. Rock is being crushed for the $90,000 farm-to-market road project.

Holmes Lime Co. of Felton, Calif., has opened a quarry on the west edge of Los Gatos, Calif., using a clam-shell shovel. Previous limestone operations in the vicinity have not been found commercially profitable as the deposits are mixed.

Maryville, Mo.: In order to insure itself against a shortage of rock crushing equipment in case it is needed to carry on WPA road surfacing projects, the Nodaway county court recently signed an option with a Kansas City firm for two crushing plants to cost $2500.

Vinita, Okla.: The city had difficulty in getting a rock crushing project O. K.'d by WPA because the amount of work involved was considerably in excess of any project considered by the state administration.

Hartshorne, Okla.: Two quarries were opened in October to produce material for the stone curbing and guttering of Lehigh Ave. and other streets and for the making of cement tiling to be used in road construction in the county.

Fulton, Mo.: A quarry for securing limestone for the soil erosion project was opened on a temporary basis in October northeast of town. However, a permanent location has not been determined, and bids for furnishing limestone have not yet been opened.

Trenton, Mo.: Township officials have leased a rock ledge on the Charles Holt farm 2 miles west of Trenton and are quarrying and crushing stone to be placed on roads. A 27-mile road project is awaiting WPA approval. The township recently bought a rock crusher.

Springfield, Mo.: The street department of Springfield purchased two rock crushers from the Associated Charities in October for $600 without troubling to consult the mayor or to get a formal order from the city council. However, since the budget tolerated the expenditure, the council O. K.'d the bills.

Catlettsburg, Ky.: Boyd county's rock crushing project is under way. Rock crushing and air compressing units were purchased recently, and four of the county's trucks are in service hauling crushed limestone to various road sites. Storage bins have been constructed at the quarry to take care of excess road materials produced.

Pleasant Hill, Mo.: The city recently applied for a new WPA street building project and is considering the purchase of a portable crusher of 15-tons-per-hour capacity for $1750, abandoning the wornout city-township crusher on the Jesse Johnson quarry. If the project is approved, the city will purchase a quarry site. The township has already contracted to buy a new crusher.

Fairfield, Iowa: An outlet from the new Jefferson county quarry on the O. J. Claridge farm has been secured through a farm owned by Mrs. Mary Carter Worm of Burlington at a cost to the county of $50. The right-of-way is 14 ft. wide, with one place wide enough for two trucks to pass. The county agreed to erect a fence and to be responsible for all damage done to livestock by the trucks.

Williston Shell Rock Co. opened its office in the Professional Bldg., Ocala, Fla., November 8. James H. Craggs is president and general manager. The company is mining 1500 tons of rock a day at its Shady Grove road quarry. It is supplying stone to Manly Construction Co., which was awarded the state contract for 5.8 miles on state road 74. It is also furnishing material for the private road to the camp of the Benjamin Foster Co. near Camp Roosevelt.

Marion, N. C.: The state highway commission has secured an option on a limestone quarry and crushing plant on the John Yancey property in McDowell county and is operating the plant to secure material for highway construction in the western part of the state. Previously the commission bought crushed stone from American Limestone Co., Knoxville, Tenn. The company will soon open a plant near Ashford to supply part of the needs of the commission.

Oskaloosa, Iowa: Mahaska county has leased the Mrs. W. L. Sprague farm south of Rose Hill to replace the Ella Helm quarry in White Oak township which is being abandoned because the cost of additional stripping is prohibitive since the best rock has already been taken. As in the Helm quarry, the county is paying 5c a cu. yd. for all rock quarried. Stripping of the Jacob Dahm quarry in Richland township was recently completed by the Lanning Construction Co.

Sand and Gravel

Gravel and Sand, Inc., Camden, Ark., recently filed notice of dissolution. J. W. Sanders was president of the company.

Olean, N. Y.: The city recently opened a gravel pit as a WPA project in the West End for production of material to be used later on roads.

Helena Sand and Gravel Co., two miles west of Helena, Mont., suffered a $2000 loss October 28 when a tool shed and its contents caught fire. George Jacoby, manager of the plant, had to order new tools by telegraph, to avoid holding up production.

Ryan-Richards Co., Oklahoma City, Okla., was recently awarded a contract to place blacktop surfacing on U. S. Highway 62 in and around Alva. The state highway commission was able to let the contract only after much controversy, involving a state court decision, a mayor's resignation, and the breaking of a tie in voting. The total cost of the 9.674 miles of asphalt surfacing will be $126,259.

Newark, Mo.: A crusher has been set up on the C. Q. Myers pasture east of town, and crushed gravel is being produced for the road west of Newark.

Cement

Dewey Portland Cement Co., Bartlesville, Okla., reopened November 14 following a shutdown since September 1, during which the plant underwent needed repairs. Better business conditions and the prospect of receiving material contracts in the government's road building program prompted the resumption of operations.

Lehigh Portland Cement Co., New Castle, Penn., resumed operation October 15 after a shutdown of several months. The plant will operate on a four-shift basis, six hours to a shift, each worker getting a 36-hour week.

The Pennsylvania-Dixie Cement Co. plant at Kingsport, Tenn., was shut down October 31 for necessary repairs. Shipments are continuing from stock.

The Washington-Idaho Lime Products Co. cement plant just east of Orofino, Idaho, held a "visitors' day" November 7. Representatives from various organizations in central Idaho and others were guests of the company at a hotel luncheon and then made a tour of the plant under the guidance of E. J. Simons of Spokane, Wash., general manager. The company recently installed a clever display in the window of the Oud-Shields Hardware Co., Orofino, showing raw cement rock, stages of manufacture, finished cement, and concrete blocks.

Monarch Cement Co., Chanute, Kan., reopened its plant for clinker manufacture on November 16, after a three months' shutdown.

Manufacturers

The American Foundry Equipment Co., Mishawaka, Ind., shipped several "Wheelabrator" jobs to Russia early in November on a recent purchase of the Amtorg Trading Corp.

General Electric Co., Schenectady, N. Y., at a board meeting in New York City on November 1, elected Henry S. Morgan and Robert C. Stanley as members of the board. Resignation on account of ill health of Thomas Cochran, former director, was announced.

Fruehauf Trailer Co., Detroit, Mich., has issued a statement denying rumors that various individuals in the trucking industry have acquired a financial interest in the company.

Combustion Engineering Co., Inc., New York, N. Y., announces the appointment as representatives for C-E stoker units of Wilson Machinery & Supply Co., Inc., Lexington, Ky.; William Franklin, Buffalo, N. Y.; and Industrial Combustion Co., Allegheny Ave. and Boudinot St., Philadelphia, Penn.

Thwing-Albert Instrument Co. is the new name adopted by Thwing Instrument Co., Philadelphia, Penn. The change in name involves no change in ownership, management, policy or product.

Link-Belt Co., Chicago, Ill., has moved its executive offices from 910 S. Michigan Ave. to the Bell Bldg., 307 N. Michigan Ave., Chicago.

The Linde Air Products Co., New York, N. Y., this year again sponsored two welding clinics for persons interested in the oxy-acetylene process of welding and cutting. The first of these clinics was held October 23-26 in Sam Houston Convention Hall, Houston, Texas; and the second was held October 30-November 2 at the Georgia School of Technology, Atlanta, Ga.

Trade Literature

Pumps. Catalog 735-J, 24 pages, presents photographs, diagrams, specifications and descriptions of the Hydroseal Sand Pump and Maximix Acid Resisting Pump. THE ALLEN-SHERMAN-HOFF CO., Philadelphia, Penn.

Pumping System. Air lift pumping of water, oil, or other fluids by compressed air is featured in Bulletin 9042, 24 pages. Theories and applications are discussed. INGERSOLL-RAND CO., New York, N. Y.

Heaters. Book 236, 24 pages, tells how to heat offices and homes efficiently, electrically and economically the "Electromode" way. ELECTRIC AIR HEATER CO., Mishawaka, Ind.

"Better Than Your Claims"--*Says This Ready-Mix Plant Operator*

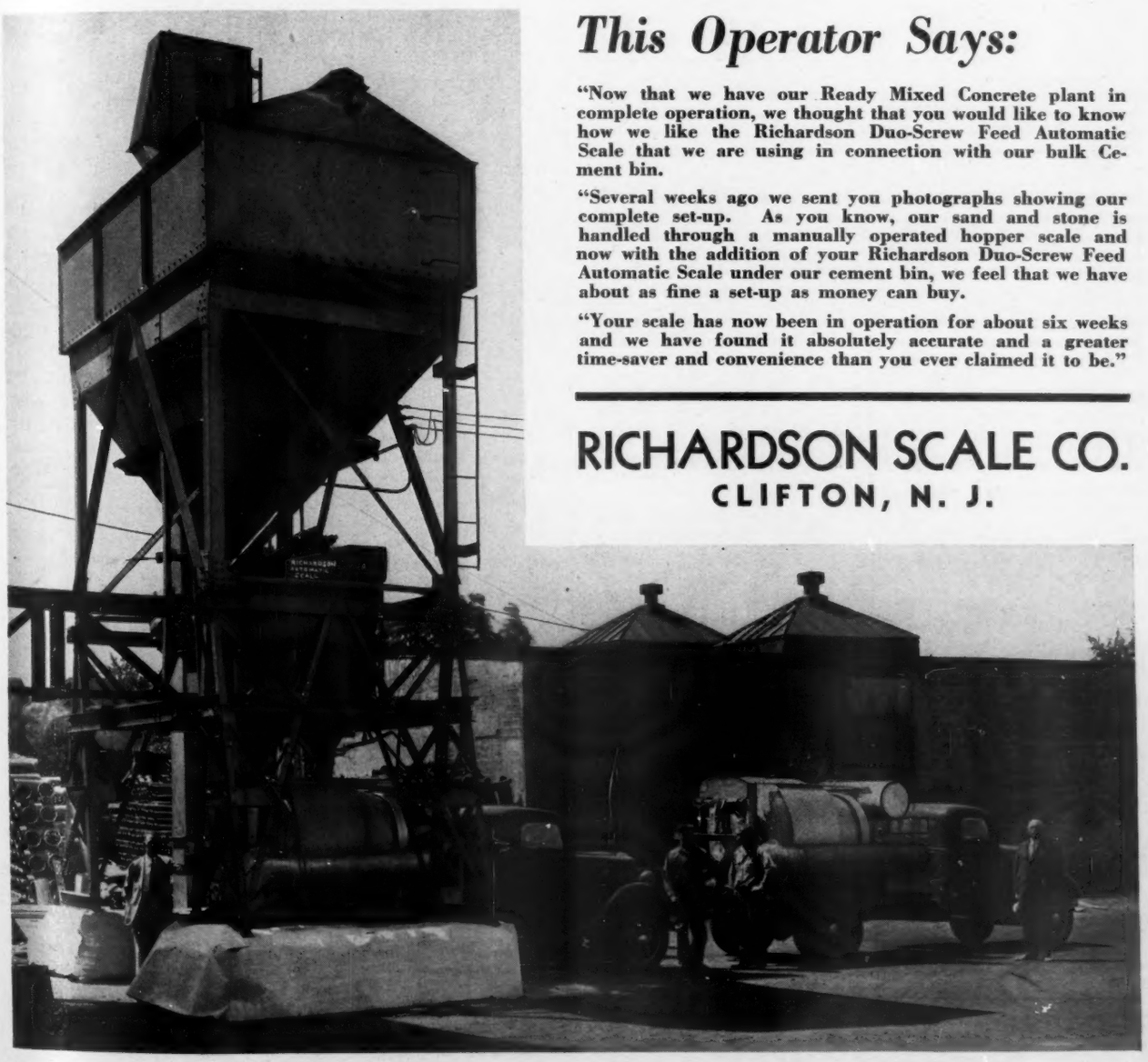
You can profit by similar savings through the installation of the Richardson Automatic Cement Scale. It saves time—is extremely accurate and remarkably convenient. You don't have to handle bags or weigh up split bags for any particular batch. Just set the scale for amount of cement required and that amount is dumped into your trucks.

The Richardson Scale has a long range of quantities per batch and a change from one quantity to another is accomplished instantly.

No delay in loading cement—the high speed loading of cement prevents tie-up of trucks.

The Richardson Automatic Cement Scale is a tremendous money-saver and profit-builder for Ready-Mix Concrete Plants. It automatically weighs, proportions and delivers any predetermined formula or mix with absolute accuracy. It eliminates errors and assures the maintenance of highest quality. Read what one operator writes—we have many such satisfied users whose names will be furnished upon request.

Write for full details, literature and free engineering advice.



This Operator Says:

"Now that we have our Ready Mixed Concrete plant in complete operation, we thought that you would like to know how we like the Richardson Duo-Screw Feed Automatic Scale that we are using in connection with our bulk Cement bin.

"Several weeks ago we sent you photographs showing our complete set-up. As you know, our sand and stone is handled through a manually operated hopper scale and now with the addition of your Richardson Duo-Screw Feed Automatic Scale under our cement bin, we feel that we have about as fine a set-up as money can buy.

"Your scale has now been in operation for about six weeks and we have found it absolutely accurate and a greater time-saver and convenience than you ever claimed it to be."

RICHARDSON SCALE CO.
CLIFTON, N. J.

Classified Directory of Advertisers in this Issue of Rock Products

For alphabetical index, see page 2

This classified directory of advertisers in this issue is published as an aid to the reader. Every care is taken to make it accurate, but ROCK PRODUCTS assumes no responsibility for errors or omissions. The publishers will appreciate receiving notice of omissions or errors, or suggestions

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Fuller Co.
Gardner-Denver Co.
Nordberg Mfg. Co.
Traylor Eng. & Mfg. Co.
F. L. Smidth & Co.
Worthington Pump and Machy. Corp.

Air Filters
Fuller Co.

Air Hoists
Curtis Pneumatic Machy. Co.

Air Separators
Bradley Pulverizer Co.
Raymond Bros. Impact Pulv. Co.
Universal Road Machy. Co.

Anti-Freeze Solution
Firestone Tire & Rubber Co.

Automatic Weighers
Richardson Scale Co.

Babbitt Metal
Joseph T. Ryerson & Son, Inc.

Backdiggers
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Backfillers
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Bagging Machinery
Richardson Scale Co.

Ball Bearings
S K F Industries, Inc.

Balls (Grinding, See Grinding Balls)

Balls (Tube Mill, etc.)
Allis-Chalmers Mfg. Co.
F. L. Smidth & Co.

Bar Benders and Cutters
Koehring Co.

Batteries
Firestone Tire & Rubber Co.

Batchers
Fuller Company

Bearings
Link-Belt Co.
Joseph T. Ryerson & Son, Inc.
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Anti-Friction)
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Roller)
S K F Industries, Inc.
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
S K F Industries, Inc.
Timken Roller Bearing Co.

Belting (Elevator and Conveyor)
B. F. Goodrich Co.

Belting (V Type)
B. F. Goodrich Co.

Belting (Transmission)
B. F. Goodrich Co.

Belts (Fan)
Firestone Tire & Rubber Co.

Bin Gates
Fuller Co.
Industrial Brownhoist Corp.
Link-Belt Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Bin-Dicator
Ripley Mfg. Co.

Bins
Austin-Western Road Machy. Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Blasting Cap Protectors
B. F. Goodrich Co.

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
S K F Industries, Inc.
Timken Roller Bearing Co.

Boilers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Boots and Shoes
B. F. Goodrich Co.

Brake Linings (Asbestos)
Firestone Tire & Rubber Co.

Breakers (Primary)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Blaw-Knox Co.
Harnischfeger Corp.
Hayward Company
Industrial Brownhoist Corp.
Link-Belt Co.
Wellman Engineering Co. (G. H. Williams)

Buckets (Dragline and Slackline)
Bucyrus-Erie Co.
Wellman Engineering Co. (G. H. Williams)

Buckets (Dredging and Excavating)
Harnischfeger Corp.

Buckets (Elevator and Conveyor)
Cross Engineering Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.

Bulldozers
Koehring Co.

Bushings (Machined or Processed)
Manganese Steel Forge Co., Inc.

Cableways
American Steel & Wire Co.
Broderick & Bascom Rope Co.
Link-Belt Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Calcining Kettles (Gypsum)
J. B. Ehrsam & Sons Mfg. Co.

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Carriers
Barber-Greene Co.

Car Pullers
Link-Belt Co.

Cars (Quarry and Gravel Pit)
Austin-Western Road Machy. Co.

Castings
Babcock & Wilcox Co.
Eagle Iron Works (Grey Iron)
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.
Jeffrey Mfg. Co.

Chain (Elevating and Conveying)
Chain Belt Co.
Link-Belt Co.

Chain Drives
Chain Belt Co.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chute Lining
B. F. Goodrich Co.

Chutes and Chute Liners
Cross Engineering Co.

Classifiers
Hardinge Co., Inc.
Knickerbocker Co.
Link-Belt Co.

Clay Working Machinery
Bonnot Company

Clips (Wire Rope)
American Steel & Wire Co.
Broderick & Bascom Rope Co.
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Austin-Western Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Compressed Air Hoists
Gardner-Denver Co.

Compressed Air Rock Drills
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Compressors (See Air Compressors)

Concrete Slab Raising Equipment (Mud-Jack)
Koehring Co.

Conveyor Idlers and Rolls
Barber-Greene Co.
Chain Belt Co.
Link-Belt Co.

Conveyors and Elevators
Earle C. Bacon, Inc.
Barber-Greene Co.
Fuller Company
Industrial Brownhoist Corp.
Jeffrey Mfg. Co. (Vibrating)
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Conveyoweighs
Richardson Scale Co.

Coolers (See Kilns and Coolers, Rotary)

Correcting Basins
F. L. Smidth & Co.

Couplings (Flexible and Shaft)
Chain Belt Co.
Link-Belt Co.

Couplings (Hose, Pipe, etc.)
B. F. Goodrich Co.

Cranes (Clamshell)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Koehring Co.

Cranes (Air Powered)
Curtis Pneumatic Machy. Co.

Cranes (Crawler and Locomotive)
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)
Link-Belt Co.

Cranes (Excavator
Koehring Co.

Cranes (Overhead Traveling Electric)
Harnischfeger Corp.
Industrial Brownhoist Corp.

Crusher Parts
Pennsylvania Crusher Co.

Crushers (Hammer)
Austin-Western Road Machy. Co.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.
Pennsylvania Crusher Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Earle C. Bacon, Inc. (Jaw))
Good Roads Machy. Corp. (Jaw)
Lewistown Fdy. & Mach. Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Crushers (Reduction)
Bonnot Company

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Crushers (Rotary)
J. B. Ehrsam & Sons Mfg. Co.

Crushers (Single Roll)
Austin-Western Road Machy. Co.
Link-Belt Co.
McLanahan & Stone Corp.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Traylor Eng. & Mfg. Co.

Dedusters
Blaw-Knox Co.

Derricks and Derrick Fittings
Harnischfeger Corp.

Diaphragms (Pump)
B. F. Goodrich Co.

Dippers and Teeth (Steam Shovel)
Bucyrus-Erie Co.
The Frog, Switch & Mfg. Co.

Dirt Moving Equipt. (Dumptor)
Koehring Co.

Ditchers
Barber-Greene Co.
Bucyrus-Erie Co.
Harnischfeger Corp.

Draglines
Bucyrus-Erie Co.
Harnischfeger Corp.
Link-Belt Co.

Draglines (Gasoline or Electric)
Koehring Co.

Dragline Excavators
Austin-Western Road Machy. Co.
Bucyrus-Erie Co.
Harnischfeger Corp.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Sauerman Bros.

Dragline Excavators (Walking)
Bucyrus-Monighan Co.

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Hetherington & Berner, Inc.
Morris Machine Works

Dredging Sleeves
B. F. Goodrich Co.

Drill Bits
Timken Roller Bearing Co.

Drill Sharpening Machines
Gardner-Denver Co.

Drilling Accessories
Gardner-Denver Co.

Drills
Bucyrus-Erie Co.
Timken Roller Bearing Co.

Drills (Diamond Core)
Chicago Pneumatic Tool Co.

Drills, Hammer (See Hammer Drills)

Drills (Rock)
Chicago Pneumatic Tool Co.
Gardner-Denver Co.

Drill Steel
Gardner-Denver Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Bonnot Company
Combustion Engineering Corp.
Hardinge Company, Inc.
Traylor Eng. & Mfg. Co.

Dumptors
Koehring Co.

Dust Collecting Systems
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.

Dust Conveying Systems
Fuller Company

Electric Cables and Wires
American Steel & Wire Co.
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.

Engineers
Bonnot Company
Hetherington & Berner, Inc.
Productive Equipment Corp.
F. L. Smidth & Co.

Engines (Diesel)
Chicago Pneumatic Tool Co.
Nordberg Mfg. Co.

Engines (Steam)
Morris Machine Works

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co.

Excavators (Dragline)
Koehring Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc.
Smith Engineering Works (Plate)

Forges (Oil)
Gardner-Denver Co.

Furnaces
Combustion Engineering Corp.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Gaskets
B. F. Goodrich Co.

Gasoline
Texas Company

Gears and Pinions
Link-Belt Co.

Gelatin and Semi-Gelatin (See Explosives)

Grapples (Stone)
Hayward Co.

Grease
Gulf Refining Co.
Texas Company

Grinding Balls
Babcock & Wilcox Co.
Jeffrey Mfg. Co.

Grizzlies
Jeffrey Mfg. Co. (Vibrating)
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.

Grizzly Feeders
Traylor Eng. & Mfg. Co.

Hammer Drills
Chicago Pneumatic Tool Co.
Gardner-Denver Co.
Worthington Pump and Machy. Corp.

Hammer Mills (See Crushers)

Hoists
Chicago Pneumatic Tool Co.
Curtis Pneumatic Machy. Co.
Gardner-Denver Co.
Harnischfeger Corp.
Link-Belt Co.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
Chicago Pneumatic Tool Co.
Firestone Tire & Rubber Co.
B. F. Goodrich Co.

I-Beam Trolleys
Curtis Pneumatic Machy. Co.

Indicators (Bin)
Ripley Mfg. Co.

Kilns and Coolers (Rotary)
Allis-Chalmers Mfg. Co.
Bonnot Company
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.

Kominuters (See Mills)

Lighters, Hot Wire (For Safety Fuse)
Ensign-Bickford Co.

Lime Handling Equipment
Fuller Company
Link-Belt Co.
Raymond Bros. Impact Pulv. Co.

Lime Kilns (See Kilns and Coolers, Rotary)

Linings (Iron for Ball and Tube Mills). See Mill Liners)

Linings (Rubber for Ball and Tube Mills)
B. F. Goodrich Co.

Loaders and Unloaders
Barber-Greene Co.
Bucyrus-Erie Co.
Fuller Company
Link-Belt Co.
Universal Road Machy. Co.

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Geared)
Lima Locomotive Works, Inc.

Locomotives (Steam, Gas and Electric)
Lima Locomotive Works, Inc.

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
American Steel & Wire Co. (Wire Rope)
Broderick & Bascom Rope Co. (Wire Rope)
Gulf Refining Co.
Texas Company

Machinery Guards
Harrington & King Perforating Co.

Manganese Steel Castings
The Frog, Switch & Mfg. Co.

Manganese Steel Parts
Manganese Steel Forge Co., Inc.

Manganese Steel (Plates and Sheets)
Manganese Steel Forge Co., Inc.

Mechanical Rubber Goods
Firestone Tire & Rubber Co.
B. F. Goodrich Co.

Mill Liners and Linings (Iron for Ball and Tube Mills)
Babcock & Wilcox Co.
Jeffrey Mfg. Co.
F. L. Smidth & Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
Bonnot Company
Bradley Pulverizer Co.
Hardinge Co., Inc.
Knickerbocker Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Traylor Eng. & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Mixers (Concrete)
Koehring Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
Harnischfeger Corp.

Multiple V Belts
B. F. Goodrich Co.

Oil Burners
Babcock & Wilcox Co.
F. L. Smidth & Co.

Oil Forges
Gardner-Denver Co.

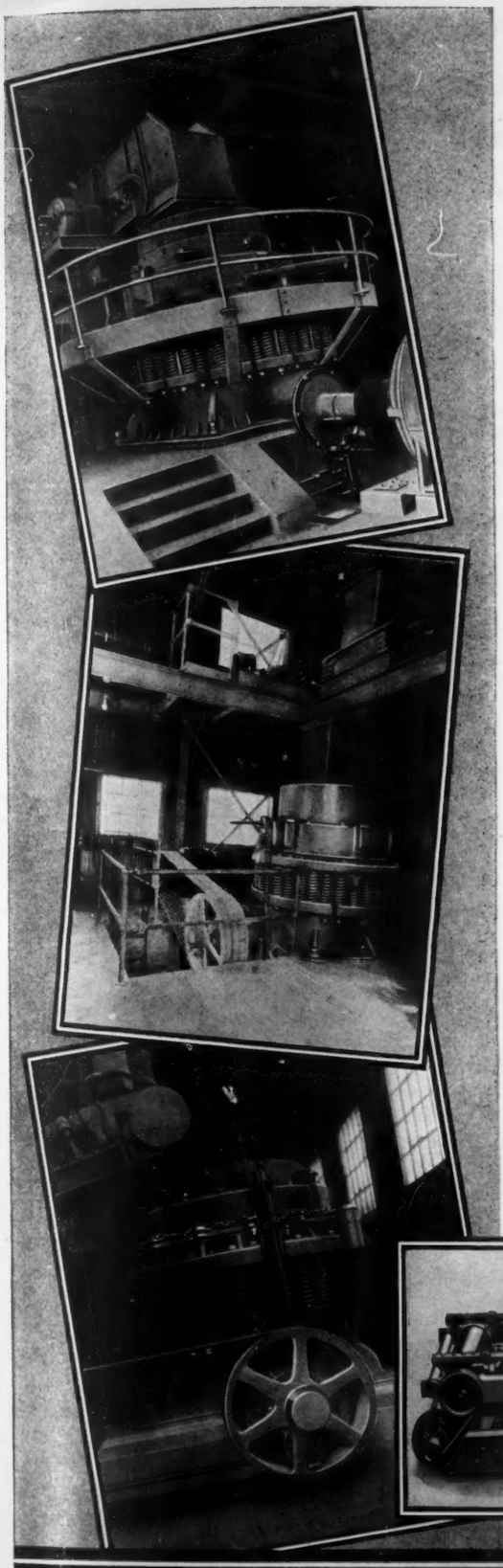
Oilers (Air Line)
Gardner-Denver Co.

Oils (Lubricating)
Gulf Refining Co.
Texas Company

Overhead Traveling Cranes
Curtis Pneumatic Machy. Co.

Paint (Asphalt)
Texas Company

Packings (Pump, Valve, etc.)
B. F. Goodrich Co.



Prepare NOW for next year's operations

If confronted with the problem of producing better materials at lower cost, Symons Crushers and Screens have a definite part in a modernization program or where increased capacity is required. This has been proved by their performance among most of the major producers of crushed materials.

For more than eight years, Symons Standard Cone Crushers have lead in the field of reduction crushing. With the trend toward finer crushing, the newer Short Head fills the need for these finer products. With their big capacity and lower crushing cost, they are a most essential factor for profitable operation.

Since the Symons Screen sets in a level position, closer grading and better screened products are assured. Where trouble is found meeting the rapidly changing and more rigid specifications, here is the screen which fulfills every expectation.

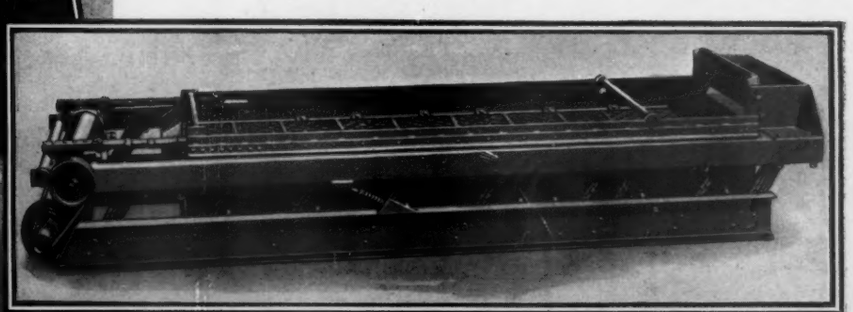
If you are contemplating any changes in your crushing or screening operations, let us tell you more about the advantages of these Nordberg Products.

NORDBERG MFG. CO.
MILWAUKEE, WIS.

New York City
60 E. 42nd Street

London, Eng.
Bush House

Los Angeles
846 Subway Terminal Bldg.



CRUSHERS - SCREENS

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Pavers (Concrete)
Koehring Co.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.

Plates (Double Corrugated)
Hendrick Mfg. Co.

Pneumatic Drills (See Drills)

Portable Conveyors
Barber-Greene Co.
Fuller Company
Link-Belt Co.

Portable Crushing and Screening Unit
Austin-Western Road Machy. Co.
Good Roads Machy. Corp.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Portable Loaders
Jeffrey Mfg. Co.

Power Transmission Equipment
S K F Industries, Inc.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Babcock & Wilcox Co.
Bonnot Company
Bradley Pulverizer Co.
Dixie Machy. Mfg. Co.
Knickerbocker Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulv. Co.
F. L. Smidth & Co.
Universal Road Machy. Co.
Williams Patent Crusher & Pulv. Co.

Pumps (Air Lift)
Fuller Company

Pumps (Cement)
Fuller Company

Pumps (Cement Slurry)
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
Bucyrus-Erie Co.
Morris Machine Works
Worthington Pump and Machy. Corp.

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Morris Machine Works
A. R. Wilfley & Sons

Ready Mixed Concrete (Truck Mixer Bodies)
Blaw-Knox Co.

Rims (Wheel)
Firestone Tire & Rubber Co.

Road Machinery
Barber-Greene Co.
Harnischfeger Corp.
Koehring Co.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rod Mills
Traylor Eng. & Mfg. Co.

Roller Bearings
S K F Industries, Inc.
Timken Roller Bearing Co.

Roofing (Ready to Lay)
Texas Company

Roofing and Siding (Steel)
Joseph T. Ryerson & Son, Inc.

Rope, Wire (See Wire Rope)

Rubber Covered Screens
B. F. Goodrich Co.

Sand and Gravel Screening and Washing Equipment
Universal Road Machy. Co.

Sand Drag
Smith Engineering Works

Sand Settling Tanks
Link-Belt Co.
Smith Engineering Works

Scales (Automatic Proportioning)
Richardson Scale Co.

Scales (Cement)
Richardson Scale Co.

Scrapers (Power Drag)
Austin-Western Road Machy. Co.
Harnischfeger Corp.
Link-Belt Co.
Sauerman Bros.

Scraping Hoists
Gardner-Denver Co.

Screens
Allis-Chalmers Mfg. Co.
Audubon Wire Cloth Corp.
Earle C. Bacon, Inc.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
Manganese Steel Forge Co., Inc.
National Wire Cloth Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
John A. Roebling's Sons Co.
Smith Engineering Works
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.
Universal Vibrating Screen Co.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works

Screens (Vibrating)
Austin-Western Road Machy. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
Smith Engineering Works
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens, Washing (Hercules, Ajax and Standard)
Smith Engineering Works

Screw Rewasher (Single and Twin)
Smith Engineering Works

Scrubbers, Washers
Hardinge Company, Inc.
Knickerbocker Co.
Lewistown Fdy. & Mach. Co.
Smith Engineering Works

Seal Rings
Traylor Eng. & Mfg. Co.

Separators (Slurry)
F. L. Smidth & Co.

Shovels, Power (Steam, Gas, Electric, Diesel, Oil)
Bucyrus-Erie Co .
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)
Link-Belt Company

Silos
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.

Slings (Wire Rope)
American Cable Co., Inc.
American Steel & Wire Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Sockets (Wire Rope)
American Steel & Wire Co.

Soft Stone Eliminator
Knickerbocker Co.

Speed Reducers
Link-Belt Co.
Traylor Eng. & Mfg. Co.

Steel (Abrasion Resisting)
Joseph T. Ryerson & Son, Inc.

Steel Bars
Timken Roller Bearing Co.

Steel (Bars, Shapes, Plates, etc.)
Joseph T. Ryerson & Son, Inc.

Steel (Electric Furnace)
Timken Roller Bearing Co.

Steel (Open Hearth)
Timken Roller Bearing Co.

Steel (Special Alloy)
Timken Roller Bearing Co.

Steel (Special Analysis)
Timken Roller Bearing Co.

Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Tanks
Combustion Engineering Corp.
Link-Belt Co.

Tire Repair Materials
Firestone Tire & Rubber Co.

Tires and Tubes
Firestone Tire & Rubber Co.
B. F. Goodrich Co.

Track Equipment
Nordberg Mfg. Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Koehring Co.

Tramways (Aerial Wire Rope)
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Trenchers
Barber-Greene Co.

Trukmixers
Blaw-Knox Co.

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
B. F. Goodrich Co.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Underground Shovels
Nordberg Mfg. Co.

Valves (Pump)
B. F. Goodrich Co.

Vibrating Screens (See Screens, Vibrating)

Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
Austin-Western Road Machy. Co.
Eagle Iron Works
Knickerbocker Co.
Link-Belt Co.
Traylor Eng. & Mfg. Co.
Universal Road Machy. Co.

Waste Heat Boilers
Combustion Engineering Corp.

Weigh-Mix
Koehring Co.

Weighing Equipment
Richardson Scale Co.

Welding and Cutting Apparatus
Harnischfeger Corp.

Welding Rod
American Steel & Wire Co.
Joseph T. Ryerson & Son, Inc.

Welding Wire
American Steel & Wire Co.
John A. Roebling's Sons Co.

Wire (Manganese Steel)
Manganese Steel Forge Co., Inc.

Wire (Rubber Insulated)
American Steel & Wire Co.

Wire Cloth
Audubon Wire Cloth Corp.
Cleveland Wire Cloth & Mfg. Co.
Manganese Steel Forge Co., Inc.
National Wire Cloth Co.
John A. Roebling's Sons Co.

Wire Rope
American Cable Co., Inc.
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
American Cable Co., Inc.
American Steel & Wire Co.
Broderick & Bascom Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Slings (See Slings, Wire Rope)

Wire Rope Sockets (See Sockets, Wire Rope)

Make Your Sand "COME CLEAN"

Complete assembly of Jeffrey Sand Settling Tank, showing Drive Side and Discharge End. Note the rigid bracing of this tank.

With Jeffrey Sand Settling Tanks

Contractors, highway engineers and inspectors are insisting upon clean sand. Result: Clean sand commands a higher market price.

Jeffrey Sand Settling Tanks will enable any sand and gravel plant to produce sand commercially free from vegetable matter, clay and loam. Because of their simplicity they function continuously without supervision. Material is delivered from washing screens to the tank, where it is held in suspension in the water. The sand settles to the bottom and is carried out by scraper flights—dirt and silt, which is lighter, goes out with the water thru the overflow.

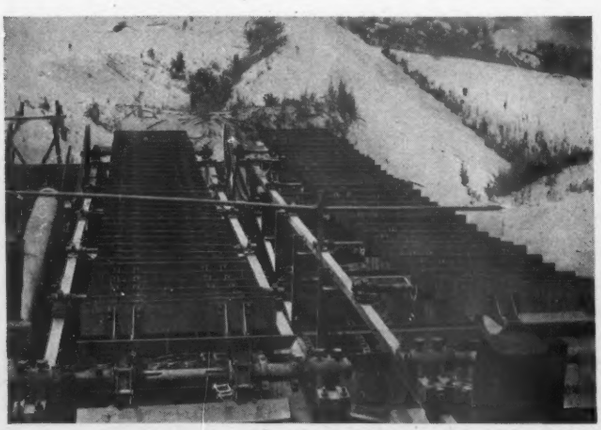
By operation of tanks in series, a final product of almost any grading may be obtained.

We will be glad to tell you how Jeffrey Sand Settling Tanks may be of service to you. Write today.

The Jeffrey Manufacturing Company

935-99 North Fourth Street Columbus, Ohio

District Offices in Principal Cities



This illustration shows two Jeffrey Sand Settling Tanks, with steel tanks, operatixg side by side in a large producing plant.

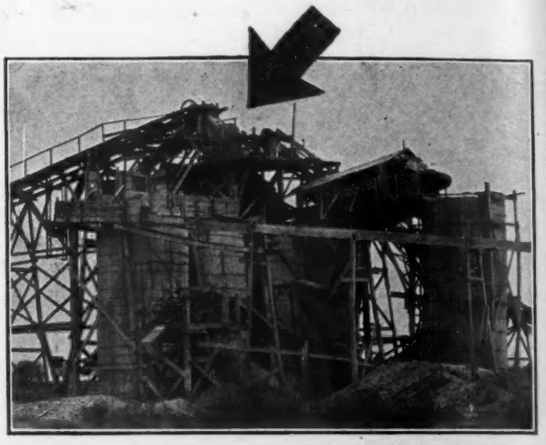
They reduced soft stone content from 10% to less than 2%

Shenk Bros., Shiawassee County, Mich., whipped their soft stone problem quickly, effectively, economically, with a Knickerbocker Soft Stone Eliminator.

You can do it, too. Write for details.

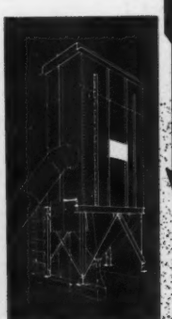
The Knickerbocker Company, 601 Liberty St., Jackson, Mich.

Here it is!



DO AWAY WITH DUST

PROTECT YOUR BUSINESS



Blaw-Knox Engineers are prepared to render a complete dust collection service from analysis of the problem to manufacture and installation of proper equipment to provide complete dust removal.

More than two hundred installations of Blaw-Knox Dust Collectors speak for themselves.

Make this service yours by telling us about your dust difficulties.

with BLAW-KNOX COMPANY
2035 FARMERS BANK BLDG. PITTSBURGH, PA.

BLAW-KNOX DUST COLLECTORS

TWO Blows or ONE

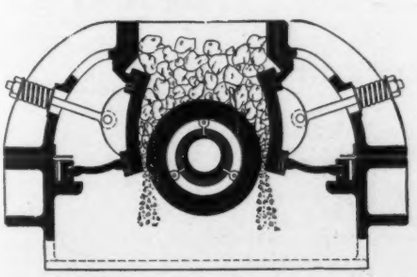
A job done quicker and better spells economy. Riveting machines as compared with the hand sledge illustrate this effectively.

In the matter of crushing, the BONNOT CRUSHER is designed to take advantage of economy by delivering TWO BLOWS INSTEAD OF ONE. In fact, the BONNOT delivers 750 BLOWS PER MINUTE—each blow timed to deliver the maximum crushing effect. Other features include Exceptional Ruggedness—Force Feed Lubrication—Manganese Steel Wearing Parts—Wear Distributed Over Entire Crushing Area—not a concentrated area. Continuous Crushing Action at All Times. Low-Power Consumption.

The BONNOT Crusher requires only 1/2 to 1/3 of usual head room and no greater floor space than crushers performing similar duty.

The BONNOT Crusher can be started fully loaded.

Ask for bulletin No. 150. This shows how material is made in one pass as compared with slabby material produced by less efficient crushers. Reproduced are also comments of prominent operators who are saving money with the BONNOT Crusher.



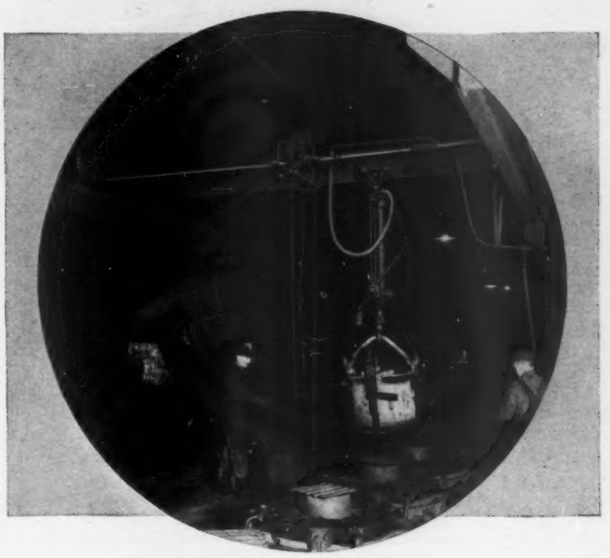
Not a roll crusher. Featuring slow creep mantle for distribution of wear

Manufactured under U. S. Patent No. 1946763

THE BONNOT CO.
CANTON, OHIO
— SINCE 1891 —

New York Office: 59 Church Street

Lift for less with CURTIS
CRANES AND AIR HOISTS



This Curtis Crane and Air Hoist installed at a cost less than ⅓ the wages of one man enables two men to do the same work as previously done by a gang. Griffin Wheel Co., Chicago

The air-power principle, plus the long experience of Curtis in designing cranes and hoists, provide the most economical and efficient lifting power available. The low cost of installation and operation makes them the logical type for many classes of industries with lift, push, or pull jobs to perform.

Curtis Cranes have large diameter, roller bearing wheels, light weight pressed steel one-piece ends, and are exceptionally easy-running.

Curtis Air Hoists can spot to a hair's breadth, using unskilled labor. Damage cannot result from overload. They are immune to injury from fumes or adverse atmospheric conditions. Upkeep is negligible. They are safe and dependable.

Write for surveys revealing remarkable service and low-cost performance records of Curtis Cranes and Air Hoists. Similar savings may be possible in your own plant.

CURTIS PNEUMATIC MACHINERY CO.
1988 Kienlen Ave., St. Louis, Missouri
New York — Chicago — San Francisco

CURTIS

COMPRESSORS—AIR HOISTS
I-BEAM CRANES and TROLLEYS

Profit by the experience behind modern Bucyrus-Erie Shovels . . . .

Bucyrus-Erie experience covers the building, in the United States and England, of over 15,000 excavators and cranes, and nearly 4,000 churn-type drills—far more than have been produced by any other manufacturer. These machines have been used in practically every country of the world, and under all manner of conditions have successfully met the tests of every kind of work. This tremendous volume of valuable experience is reflected in the practical convenience, the dependable performance, and the sustained high output which are characteristic of Bucyrus-Erie equipment.

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY

South Milwaukee, Wis., U. S. A.

Excavating, Drilling and Material Handling Equipment

849

SHAY GEARED LOCOMOTIVES

---Built for Quarry Service!

THERE'S no question about the adaptability of Shay Geared Locomotives to quarry service. They are built for it.

Shay Geared Locomotives are rugged. This fits them to withstand abuse and to give continuous, dependable operation under the most severe conditions.

Shay Geared Locomotives have great power. Their three-cylinder engines start heavy loads quickly and pull them up hard-to-climb grades without difficulty or delay. Speedier car movement keeps quarry production at a maximum.

Because of these advantages . . . and others we will gladly tell you about . . . the Shay is the most reliable locomotive investment you can make. Write for catalog.

LIMA LOCOMOTIVE WORKS, Incorporated

LIMA, OHIO

Sales Office: 60 E. 42nd St., New York, N. Y.

CLASSIFIED ADVERTISEMENTS

POSITIONS WANTED — POSITIONS VACANT—two cents a word. Set in six-point type. Minimum $1.00 each insertion, payable in advance.

INFORMATION
Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED — Displayed or undisplayed. Rate per column inch, $4.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

Used Equipment for Sale

LOCOMOTIVES

3—50-ton American 4-wheel saddle tanks, 16x24" cylinders. All have Code boilers.
4—40-ton American 4-wheel saddle tanks, 14x22" cylinders. All have Code boilers.
2—38-ton Porter 4-wheel saddle tanks, 14x20" cylinders; Code boilers.
1—70-ton Baldwin 6-wheel Switcher with separate tender, 20x26" cylinders, Code boiler.

LOCOMOTIVE CRANES

1—50-ton Industrial 8-wheel, 75′ boom.
1—25-ton Browning 8-wheel, 50′ boom.
1—20-ton Industrial 8-wheel, 50′ boom.
All have Code boilers.

Complete stock list furnished on request.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY
BIRMINGHAM, ALABAMA

MUST MOVE

Several Steel Buildings (Modern)

2—Smidth Tube Mills. 5′x22′.
2—No. 80 Bailey Feeders.
1—No. 6 Williams Crusher.
2—Dings No. 2 Magnetic Separators.
2—No. 57 Fuller Lehigh Mills.
1—AC Gates 4K Gyr. Crusher, 8x30.
2—Penn S-7 Hammer Crushers, 36x16.
1—AC McCulley Crusher, 10x52.
1—Goodman No. 48 u/g Elec. Shovel.
1—25-T Loco. Crane, 50′ & 75′ Booms.
1—5-yd. Williams Clam Bucket.
2—80 c.f., 5-ton Hulett Buckets.
3—1½-yd. Brown Ore Buckets.
2—0-6-0 50-ton Baldwin Locos.
20- and 30-yd. Dump Cars.
50-ton Gondola and Hopper Cars.
All types of Crushers and Equipment.

IRON & STEEL PRODUCTS, Inc.
657 RAILWAY EXCHANGE, CHICAGO

2-yd. Marion 480 Shovel-Crane.
1¼-yd. Byers Shovel-Crane.
Lorain 75 Shovel.
1-yd. Koehring Crane.
¾-yd. P. & H. Shovel-Crane.
½-yd. Byers Shovel-Crane.
½-yd. Thew-Universal Crane.
48 Steel Stone Skips 3 and 4 yd.
Compressors: 1300, 1245, 1190, 450, 310, 265, 250, 110 ft.
Draglines and Slacklines, ½, 2 and 3 yd.
Crushers: Telsmith 13A, 40.
Electric Hoists 10, 30, 60, 80, 125 HP.
Derricks—All steel:
3 Guy 15 ton 115 mast, 100 ft. boom.
2 Stiff-leg 10 and 15 ton, 90 ft. boom.
Drill sharpener, furnace and grinder.
Orange Peel and Clamshells: 2, 1½, 1¼, 1, ¾ yd.
Pumps: 1,000 to 5,000 gal.
3—12 ton 36" gauge gas locomotives.

J. T. WALSH
500 Brisbane Bldg. Buffalo, N. Y.

(Classified Advertising Continued on Next Page)

Continued from Preceding Page

USED EQUIPMENT

GOOD USED EQUIPMENT

SELECTED SPECIAL ITEMS

4—Symons Cone Crushers, 2′, 3′, 5½′, 7′.
2—36″x54″, 48″x72″ Buchanan Jaw Crushers, all steel, type C.
1—24″x36″ Worthington Jaw Crusher.
2—20″ Superior McCully Gyratory Crushers.
1—No. 1260 Jeffrey Bakstad Jaw Crusher, 12″x30″ feed, 12″x60″ dis., to ½″.
1—42″ Merrick Conveyor Weightometer.
1—12′ Gayco Air Classifier, type No. 21.
1—8′8″x85′ Ruggles-Coles class A Rotary Dryer; also 5′x26′ rebuilt at our shops.
2—6′x35′ Louisville Hot Air Rotary Dryers.
2—6′x45′ Rotary Dryers, Monel Lined.
2—6′6″x60′ Vulcan Rotary Kilns.
1—3 roll Raymond High Side Mill.
2—4 roll Raymond Low Side Mills.
5—Raymond Pulverizers, Nos. 0000, 00, 1, 3.
6—Hardinge Ball Mills, 4½′x16″, 6′x22″, 6′x36″, 7′x36″.
1—10′ Clyde Lime Hydrator.
1—24″x72″ Magnetic Pulley with M.G. set.
3—5′x22′ A-C Gates iron lined Tube Mills.
1—3′x12′ Hendy Tube Mill, iron lined.
2—4′x10′-5′x10′ Rod Mills.
3—8′x8′ Oliver Rotary Vacuum Filters.
1—36″x36″ Gruendler heavy duty Hammer Mill, roller bearings, No. 4XC.
1—24″ Mikro Pulverizer, d.c. 40 H.P. A.C. Motor.
1—7″x24″ Sturtevant Jaw Crusher, to ½″.
2—20″x14″, 36″x16″ Sturtevant Crushing Rolls.
1—30 ton Plymouth Gas. Locomotive, New 1929.
7—3′x5′, 4′x5′, 4′x7′ Tyler Hummer Screens.
1—3′x6′ Huron Vib. Screen, two deck.

SEND FOR BULLETIN OF

our regular stock of Crushers; Vibrating Screens; Ball, Rod and Tube Mills; Air Compressors; Rotary Kilns and Dryers; Hardinge Ball and Pebble Mills; Raymond and other Pulverizers; Air Classifiers; Thickeners; Wet Classifiers; Filter Presses; Continuous Filters, etc.

CONSOLIDATED PRODUCTS COMPANY, INC.

15 - 16 - 17 Park Row, New York City

Shops and Yards at Newark, N. J. cover eight acres.

42-inch by 20 ft. Dryer.
No. 4 Bonnot 4 x 22 Tube Mill.
Traylor 6 x 8 Tube Mill.
100 Hp. Worthington Diesel Elec. Unit.
750-yd. and 1250-yd. Asphalt Plants.
2—1¼-yd. Thew Steam Shovels.
2—2-yd. cap. Bucyrus Diesel Draglines.
15 ton Industrial Gas Caterpillar Crane.
½-yd. Speeder Caterpillar Crane.
Champion 1030 and 1040 Roller Bearing Jaw Crushers.
42 x 36 Allis Chalmers Jaw Crusher.
Pennsylvania SX4, SX6 and SXT12 Hammermills.
Clyde Lime Hydrator.
Raymond Size O Lime Pulverizer.
Keystone Gasoline Operated Well Drill.
3—870-ft. XCB Air Compressors.
Superior 10-in. and 36-in. McCully Crushers.
Traylor 4—10TZ Reduction Crusher.
24x36, 18x36, 13x30 Farrel Jaw Crushers.

R. C. STANHOPE, Inc.
875 Sixth Ave. New York, N. Y.

---

1 — JEFFRY TRAYLOR VIBRATING SCREEN

Double Deck, size 48x78, Model FB 4. In perfect condition. For sale at a bargain.

GORDON CONSTRUCTION CO.
1900 31st St., Denver, Colo.

USED EQUIPMENT

FOR SALE
12—5-yd. 36″ ga. Western Dump Cars.
6—2-yd. 36″ ga. Koppel Steel V Dump Cars.
4—1½-yd. 36″ ga. Insley Steel V Dump Cars.
2—3½-ton 36″ ga. Whitcomb Gasoline Locomotives.
1—9x10 Sturtevant Vertical Steam Engine.
1—10x10x12 Ingersoll Steam-Driven Air Compressor.
1—9x10 Lidgerwood 3-Drum Steam Hoist.
1—8¼x8 Lidgerwood S.D. Steam Hoist.
22—12-yd. Western std. ga. Air or Hand Dump Cars.
2—40-ton Baldwin S.T. Locomotives, 14x 22 cyls.
Rails—First-Class Relay Rails and Bars, 60, 70, 80, 85, 90 and 100 lb. Rails, Tie Plates, etc.

HYMAN-MICHAELS CO.
20 N. Wacker Dr. Bldg., Chicago
Railway Exchange Bldg. St. Louis, Mo. 101 West 31st St. New York

---

SLACKLINE AND DRAG SCRAPER BARGAINS
1—½ yd. Slackline with 2 speed gasoline hoist.
1—¾ yd. Slackline with 2 speed Thomas hoist.
1—1½ yd. Drag Scraper outfit either gasoline or electric power.
1—2 yd. Drag Scraper outfit, either power.
Most all sizes of used buckets, hoists, wire rope, etc.
"Everything in slackline and drag scraper outfits"
S. O. NAFZIGER, 53 W. Jackson Blvd., Chicago

3—100 HP. LEROI GASOLINE POWER UNITS
Model RXI, 6½x7, 850 RPM, Rebuilt.

B. M. WEISS
Telephone— Rittenhouse 2311 1323 Widener Building Philadelphia, Pa.

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C., for sale at attractive prices. New and Rebuilt. All fully guaranteed. Write for List and Prices.

V. M. NUSSBAUM & CO.,
Fort Wayne, Indiana

CARS
12-Yd. Western Air, also Hand Dump Cars, Flats, Gondolas, Steel Hopper Cars, Box Cars, Locomotives.

HYMAN-MICHAELS COMPANY
20 N. Wacker Dr. Bldg., Chicago, Ill.
Railway Exch. Bldg. St. Louis, Mo. 101 West 31st St. New York

---

FOR SALE—1 complete 10″ Dredge Boat equipped with 40-foot Eagle Swintex Ladder and Amsco Heavy-Duty Pump.

Arkadelphia Sand & Gravel Co.
Arkadelphia Ark.

FOR SALE
Link-Belt Shaw Classifiers
4-24 inch
1-30 inch
Priced reasonable for quick sale.
TERRE HAUTE GRAVEL COMPANY
Terre Haute, Indiana

FOR SALE—Two Telsmith No. 3 Gyratory Crushers. Two Sauerman Complete Slackline Cableways, including 1-yd. and ¾-yd. buckets. One Clyde Single-Speed, Double-Drum Steam Hoist. One 65-ft. Steel Mast. Three—one 5″, two 3″ Steam Pumps. Two Houston, Stanwood, Gamble 90 H.P. Boilers. Excellent condition—no reasonable offer refused.
Louis Ebbe Gravel Co., Waupaca, Wis.

USED EQUIPMENT

Jaw Crushers—2″x4″ up to 66″x84″.
Crushing Rolls—12″x12″ up to 54″x64″—Gyratory Crushers.
Ring Roll Mills — No. 0 and No. 1 — Swing Hammer Mills.
Rotary Fine Crushers—No. 1, No. 1½, No. 3.
Direct Heat Rotary Dryers—4′x30′, 5′x30′, 5½′x40′, 6′x50′, and 8½′x25′.
Semi-indirect Heat Dryers, 4′x30′, 4½′x26′, 5′x30′ and 8½′x75′.
Cement Kilns—3′ up to 8′ diameter.
Hardinge—Marcy & Fuller—Lehigh Mills.
Raymond Mills—No. 00, No. 0 and No. 1.
Tube—Rod and Ball Mills—4′ to 8′ diameter.
Air Separators—3′ and 10′ Gayco - Screens.
Complete drying and asphalt mixing plants.
2—8′x72″ Hardinge Mills—90% new.

W. P. HEINEKEN
95 Liberty St., N. Y. Tel.: Barclay 7-7298.

SEND FOR CATALOG NO. 110
VISIT WITH US WHILE IN ST. LOUIS FOR THE 1936 CONVENTION

Mississippi Valley Equipment Co.
515 Locust St. St. Louis, Mo.

Crushers, Hoists, Derricks, Turbines, Motors, Generators, Diesel Engines, Cars, Locomotives, Cranes, Draglines, Buckets, Tanks, Transformers.

FOR SALE
One 2-Yd. Marion all electric Shovel on cats with MG set, 34 ft. Boom, easily converted to dragline, excellent operating condition. Bargain. One 25-Ton Link-Belt Locomotive Crane, 50 ft. Boom, with 1½ Yd. Bucket. Modern. One 50-Ton Std. Gauge American Steam Locomotive.
Address Box 699, care of Rock Products, 330 South Wells St., Chicago, Ill.

New—RAILS—Relaying
ALL SECTIONS
Also contractors equipment, "V" shaped and Western cars, 24 and 36-in. gauge, portable track, gas locos, frogs and switches. Attractive prices quoted, wire for quotations.

M. K. FRANK
480 Lexington Ave. New York, N. Y. Pittsburgh Pennsylvania

USED EQUIPMENT WANTED

WANTED

10 or 15 Western or Koppel 5-Yard Side Dump Cars, 36″ Gauge.
2—12 to 14-ton Plymouth Locomotives.

DIXIE LIME PRODUCTS COMPANY
Box 578 Ocala, Florida

WANTED TO PURCHASE

Good second-hand power concrete block equipment, location northwest. Address Box 697, care of Rock Products, 330 South Wells Street, Chicago, Illinois.

WANTED—Several Raymond or Williams roller mills of various sizes to be rebuilt for export. Condition immaterial, but must be cheap for cash. Describe fully. Address

Box 696 care of Rock Products
330 South Wells St. Chicago, Ill.

"E. C. A. REBUILT" QUARRY AND GRAVEL PLANT EQUIPMENT

AIR COMPRESSORS

Portable and stationary, belt, with elec. or gas. power, sizes from 21 cu. ft. to 1,000 cu. ft.

BUCKETS

246—Buckets, all sizes and makes.

CARS

Large lot including std. ga. 6 and 12-yd. and 20-yd., 36-ga. 5-yd. and 24-ga. 1½-yd. Also std. ga. flat cars and ballast cars.

48—Koppel Quarry cars 42" ga. 2½-yd. One way side dump.

CONVEYORS and ELEVATORS

9—Port Belt Conveyors with steel frame, gas. or elec. pr. 18 and 24 in. Barber-Greene and Chic. Automatic.

1—Stationary: Barber-Greene 18"x 100'.

11—Bucket elevators: 6 Chain Belt Co. and Weller and Link Belt vertical enclosed type; capacities from 35 to 117 tons per hour. 5—Weller inclined type Nos. 3, 4, 5 and 6 up to 170 yds. per hr.

HOISTS

Gasoline, electric and steam. All sizes.

CRANES & DRAGLINES

1—Northwest Model 104 No. 1427, 45-ft. boom, 1½-yd. bucket.

2—Osgood Nos. 2054, 2069 with 40-ft. boom, 1 with 1-yd. shovel front.

1—Brownhoist No. 2 No. 9964, 40-ft. boom, 1-yd. bucket.

1—Link-Belt K-1 No. 1024, 50-ft. boom, 1-yd. bucket.

1—Industrial Brownhoist type CC, No. 5071, 36-ft. boom, ½-yd. bucket.

CRUSHERS

1—Symons No. 5½ coarse cone, No. 521.

2—No. 3 McCully gyratory crusher.

1—Set Power and Mining size 42 in. x 16 in. smooth crushing rolls.

1—No. 6 Champion 12 ft. x 26 in. jaw crusher No. U-1075-4.

DERRICKS

Steel and wood, stiff leg, or guy; from 5 to 50 tons, including 3 steel stiff legs: 1—20-ton Terry 100 ft. boom; 1—10-ton Insley 80 ft. boom and 1—10-ton American, 80 ft. boom.

PUMPS

All sizes and types, both force, centrifugal and steam.

SCREENS

3—Allis Chalmers roller type heavy duty 2—48 in. x 18 ft.; 1—51 in. x 21 ft.

1—Stephens Adamson 3 ft. x 6 ft. double deck suspension type vibrating screen.

SHOVELS

1—Model "00" Thew crawler mounted gas. shovel with ½-yd. dipper.

1—Link Belt type K-25 ¾-yd. gas comb. shovel and crane; shop No. 1521; 60-ft. crane boom; 23 ft. shovel boom.

Equipment Corporation of America

PHILADELPHIA — P. O. Box 5419, Kingsessing Sta. Phone Granite 7600

CHICAGO — 1119 S. Washtenaw Ave. Phone Nevada 2400

PITTSBURGH — P. O. Box 933 Phone Federal 2000

CONSULTING ENGINEERS

H. J. BROWN
CONSULTING ENGINEER
85 Doane Street, Boston, Massachusetts
Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.
Consultation — Design
Examinations — Construction
Reports — Supervision

WE LOOK INTO THE EARTH
By using Diamond Core Drills. We drill for Limestone, Gypsum, Talc, Fire Clay, Coal and all other minerals.
PENNSYLVANIA DRILLING CO.
Drilling Contractors
Pittsburgh, Pa.

H. D. RUHM
Consulting Engineer
Dealer in PHOSPHATE LANDS and all grades of rock.
10-mesh PHOSPHATE FILLER, $3.00 net ton
40 years' experience TENNESSEE PHOSPHATE FIELD. Correspondence solicited. Can find what you want if it can be found.
305 West Seventh St., Columbia, Tennessee

POSITIONS VACANT

POSITION OPEN

Superintendent familiar with production and processing or fabricating rock wool for the general market. State experience and salary expected.

Address Box 694, care of ROCK PRODUCTS 330 South Wells Street, Chicago, Ill.

WANTED—GOOD YOUNG MAN EXPERIENCED in lime and crushed stone, and quarry management. Good layout for right man. Must have some cash to take interest in the business with management, if found competent. Invite investigation. Age and health reason for change. Address Box 698, care of Rock Products, 330 South Wells St., Chicago, Ill.

POSITIONS WANTED

POSITION WANTED AS SUPT. WITH A progressive stone company; 20 years' experience operating limestone quarries and crushing plants; familiar with all modern equipment, efficient handling of labor with record of low cost of production; qualified to assume full charge of any size plant or plants; unquestionable references. Open for engagement. Address Box 654, care of Rock Products, 330 South Wells St., Chicago, Ill.

POSITION WANTED BY CHEMIST WITH 15 years' experience as Superintendent and Chief Chemist of cement plants. Capable of handling plant labor and all departments efficiently. Will accept position in either capacity. Excellent reference. Address Box 693, care of Rock Products, 330 South Wells St., Chicago, Ill.

THESE columns offer you the best medium in the rock products industry for the sale, exchange and purchase of used equipment, rock, quarry and gravel-pit property; the circulation and buying influence of Rock Products extends beyond those now actually engaged in operating plants; it includes mining engineers and capitalists who may be reached through no other medium, because of Rock Products' world-wide reputation as the *business journal* of the rock products industry.

Free Service to Subscribers

RESEARCH SERVICE DEPARTMENT,
Rock Products and Cement and Engineering News,
330 South Wells St., Chicago, Ill.

Please send me catalogs and prices concerning the following items checked below:

.....Air Compressors.	.....Classifiers.	.....Engines, Gasoline.	.....Magnetic Separators.	.....Rope, Manila.
.....Agitators.	.....Clips, Wire Rope.	.....Engines, Oil.	.....Mixers.	.....Safety Clothing, Etc.
.....Anvils.	.....Clutches.	.....Fire Brick.	.....Motors.	.....Sand-Lime Brick Machinery.
.....Bags.	.....Compressors.	.....Floor Tile Machines.	.....Motor Trucks.	.....Sand Pumps.
.....Bag Printing Machines.	.....Conveying Equipment.	.....Forges.	.....Moulds (Building Tile, Block, Burial Vault, Etc.)	.....Sand Washing Boxes.
.....Bagging Machines.	.....Conveyors.	.....Frogs and Switches.		.....Scrapers.
.....Belt Dressings.	.....Cranes.	.....Gas Producers.		.....Screening Equipment.
.....Belting, Conveying.	.....Crusher Parts.	.....Gear Speed Reducers.	.....Oil Storage.	.....Screening Plants.
.....Belting, Transmission.	.....Crushing Plants.	.....Gears.	.....Oils and Lubricants.	.....Screens.
.....Bins.	.....Crushers.	.....Generators, Electric.	.....Packing, Hydraulic.	.....Sheaves.
.....Bin Gates.	.....Derricks.	.....Hand Shovels.	.....Packing, Piston.	.....Steam Shovels.
.....Blast Hole Drills.	.....Dragline Excavators.	.....Hoisting Engines.	.....Packing, Sheet.	.....Steel, High Speed.
.....Blasting Powder.	.....Dragline Cableway Excavators.	.....Hoists.	.....Packing, Superheat.	.....Steel, Manganese.
.....Block Machines.	.....Dredging Pumps.	.....Hose, Air Drill.	.....Paints and Coatings.	.....Stokers, Automatic.
.....Bodies, Motor Trucks.	.....Drill Steel.	.....Hose, Pneumatic Tool.	.....Perforated Metal.	.....Tanks, Steel.
.....Boilers.	.....Drill Sharpening Machinery.	.....Hose, Steam.	.....Pipe, Iron.	.....Tanks, Wood.
.....Brick Machines.	.....Drills, Blast Hole.	.....Hose, Water.	.....Pipe, Machines.	.....Tracks.
.....Buckets.	.....Drills, Hand Hammer.	.....Hydraulic Dredges.	.....Power Transmitting Equipment.	.....Track Material.
.....Buildings, Portable.	.....Drills, Tripod.	.....Industrial Railways.	.....Pulleys.	.....Transformers, Electric.
.....Cable Coatings.	.....Dryers, Sand and Stone.	.....Lights, Carbide.	.....Pulverizers.	.....Unloaders.
.....Cableways.	.....Dynamite.	.....Lime Hydrators.	.....Pumps, Centrifugal.	.....Valves.
.....Calcining Machinery.	.....Dump Bodies.	.....Lime Kilns.	.....Pumps, Electric.	.....Washing Equipment.
.....Cars.	.....Dump Cars.	.....Loaders, Jar.	.....Pumps, Gasoline.	.....Weighing Equipment.
.....Car Pullers.	.....Dump Wagons.	.....Loaders, Wagon.	.....Pumps, Steam.	.....Welding, Electric.
.....Car Replacers.	.....Dust Collecting Systems.	.....Locomotive Cranes.	.....Pyrometers.	.....Welding, Oxy-Acetylene.
.....Cement Brick Machines.	.....Elevators and Conveyors.	.....Locomotives, Electric.	.....Rails.	.....Winches.
.....Chain Drive.	.....Elevating Equipment.	.....Locomotives, Gasoline.	.....Respirators.	.....Wire Cloth.
.....Chain Hoists.	.....Engineering Service.	.....Locomotives, Steam.	.....Rock Drills.	.....Wire Rope.
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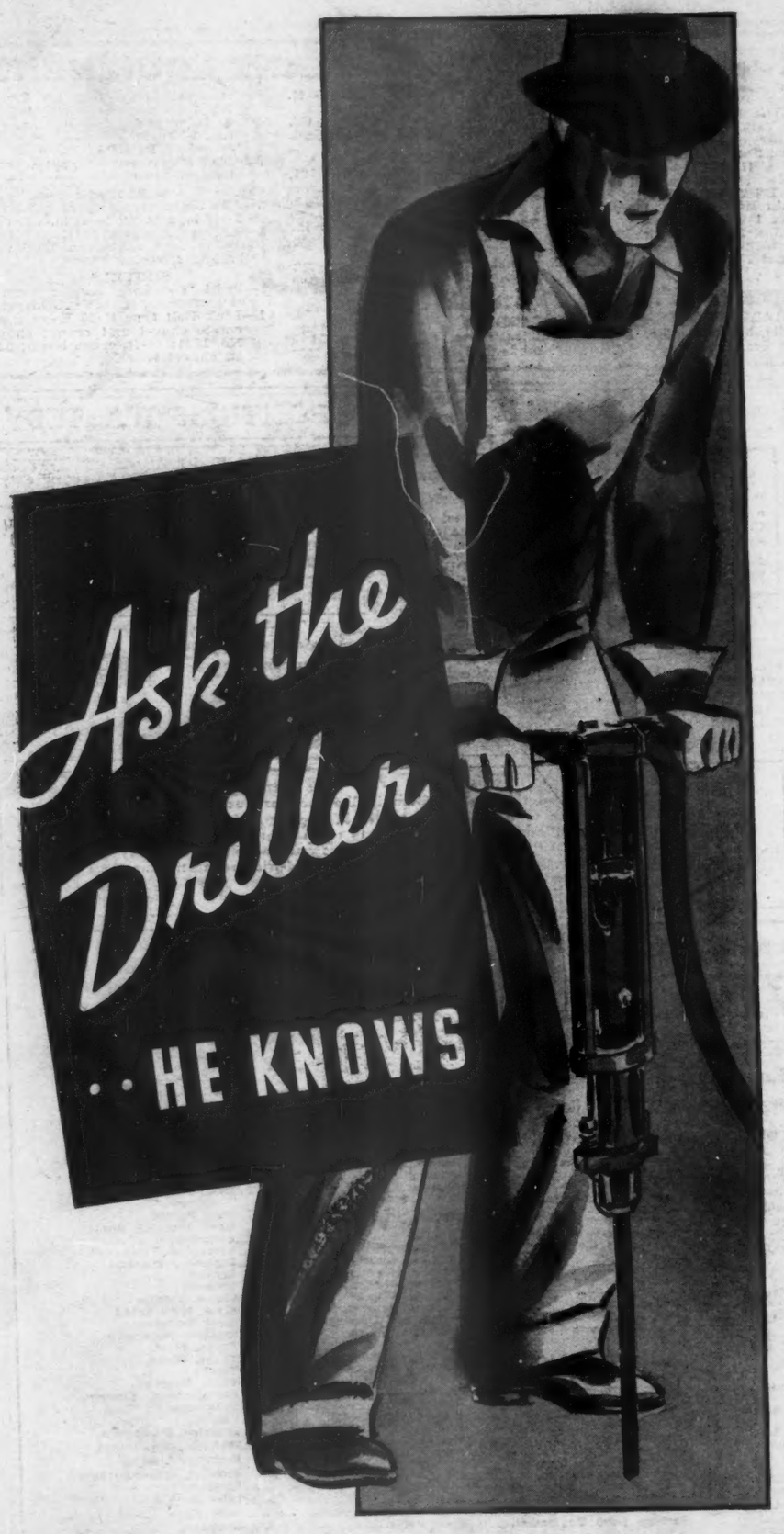
		.....Machine Shop Equipment.	.....Rope Drive.	

Firm Name.....

Individual.....

Address.....

City.....State.....



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